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ABSTRACT

In response to concerns of unnecessary duplication in programs offered by Texas community/junior colleges and the Texas State Technical College (TSTC) system, TSTC conducted an examination of curricula, enrollments, and outcomes for both systems. This report provides findings from the first phase of the study based on Texas Higher Education Coordinating Board reports and official documents for the 1990-91 academic year and for the 1990 federal fiscal year. Following introductory materials describing the purpose of the study, results are presented from a literature review focusing on differences between community and technical college education and data collection methods are described. Comparative findings are then provided for the following areas: (1) institutional curricula, indicating that community college technical clusters reflected "service-related" technologies (e.g., marketing, office skills, and health care), while TSTC reflected "export-related" technologies (e.g., manufacturing, electronics, and computers); (2) program graduates and graduate percent yield (GPY), revealing that community colleges graduated 16% of enrolled technical students, compared to 33% for TSTC; (3) GPY for ethnic groups and special populations, indicating that 19% and 7[illegible] of TSTC's graduates were classified as handicapped and disadvantaged, compared to 4% and 36% for community colleges; (4) curricula and GPY for metropolitan and non-metropolitan community colleges, finding little difference in curricula but higher a percentage of graduates in non-metropolitan colleges; and (5) state funding per technical program cluster, indicating that TSTC had a cost per graduate of $8,649 in "service-related" and $11,801 in "export-related" clusters, compared to $9,175 and $15,613, respectively, for community colleges. (KP)

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ED 388 331

A COMPARATIVE ANALYSIS OF POSTSECONDARY TECHNICAL EDUCATION IN TEXAS

PHASE I

VOLUME I - REPORT

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PREPARED BY:

TEXAS STATE TECHNICAL COLLEGE SYSTEM

OFFICE OF THE CHANCELLOR
Cecil L. Groves

and

OCCUPATIONAL AND INSTITUTIONAL RESEARCH
J. Gary Hendricks
Teresa S. Isbell

June 11, 1992

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A COMPARATIVE ANALYSIS OF POSTSECONDARY TECHNICAL EDUCATION IN TEXAS

INTRODUCTION

Global competition, a growing national debt, declining state budgets, dislocated workers, fear of unemployment, and public discontent are cause for national and state concerns. Education is the single best hope for a successful economic future and desirable quality of life because people with knowledge and skills are the most significant asset a state or nation can possess in the worldwide race to create and apply technology. In contrast, poor education poses the greatest potential threat to a state and the nation in the present and throughout our future.

Quality technical education is an economic and social essential for Texas. Smart people are necessary to produce smart goods and valued services which, in turn, create individual and public wealth and economic strength and stability. High performance organizations pay higher wages for more advanced skills to produce customer satisfaction. People need jobs, good jobs that pay enough for a family to enjoy the fruits of their labor. Business and industry, particularly small- and medium-size firms, need an educated and well-trained work force capable of helping them to modernize the workplace to be competitive in the world market. How do we provide quality technical education for the job goals of Texans, and the productivity goals of Texas business and industry during a time when state resources are diminished?

Because of its value in the marketplace, technical education, like the rest of higher education and public schools, is being held accountable for quality and performance. Analysis of performance must begin by identifying the current status of technical education. The primary public institutions in Texas that provide postsecondary technical education and training are the four campuses of Texas State Technical College and the 65 campuses of community/junior colleges. An evaluation of key performance indicators of <u>both</u> technical education delivery systems is necessary to identify comparative benchmarks for assessment of outputs and outcomes.

For example, who enrolls and who graduates from technical programs? If few graduate, and even fewer obtain jobs, what is the need for a particular program? Is

postsecondary technical education in Texas really meeting the needs of the "New Texas" for those who want to work and have been denied the opportunity to succeed for themselves and for the state? Do the graduates of technical programs meet the economic goals of Texas? These are a few of the concerns that should be addressed in performance analysis.

Historically, public policy questions have focused primarily on access (enrollments) with little concern given to individual progress (graduation) or the type of technical program offered (service-related or export-related). Has technical education evolved into a passive role in economic development that only responds, or, is it proactively pursuing goals and objectives supportive of the Texas economy? These questions deserve answers; factual answers, not just self-serving rhetoric.

Purpose of This Comparative Analysis Study

Texas State Technical College (TSTC) is undergoing review by the Texas Higher Education Coordinating Board to determine ". . . the continuation or possible relocation and/or abolishment of existing TSTC campuses and extension centers . . ." (Rider #30 Texas Higher Education Coordinating Board Appropriations Bill, 1991) and to report those findings to the Legislative Budget Board by August 31, 1992. At the same time, a second review of TSTC is being conducted by a Subcommittee of the House Committee on Higher Education whose members are Representative Wilhelmina Delco, chair, Representative Tom Uher, and Representative Dan Kubiak. These reviews were undertaken due to a concern that unnecessary duplication exists in programs offered by TSTC and the Texas community/junior colleges. TSTC determined that a comparative analysis of key descriptive data and performance indicators for the vocational/technical programs offered by TSTC and the community/junior colleges would significantly enhance the state studies, while providing analysis of some of the more probing questions mentioned in the preceding section.

Scope of the TSTC Study

Public two-year colleges that include 49 districts, 65 campuses, and an estimated 250 extension centers of the Texas community/junior colleges and the 4 campuses and 3 extension centers of TSTC were the population of the comparative analysis study. Utilizing the most recent available data (time specific and annualized) comparisons were made

between the public community/junior colleges and TSTC to determine any existing differences in:

(1) institutional curricula profiles;
(2) institutional and program graduates and "Graduate Percent Yield;"
(3) special populations and "Graduate Percent Yield;"
(4) major metropolitan area institutions (large) excluding TSTC;
(5) balance of state institutions (small) excluding TSTC;
(6) cost per graduate;
(7) export-related program clusters; and
(8) service-related program clusters.

REVIEW OF STUDIES AND LITERATURE ON POSTSECONDARY TECHNICAL EDUCATION

A review of the literature was conducted by TSTC to provide background information, context, and understanding of potential differences between community/junior college and technical college education. Primary sources of information reviewed for the TSTC study were published in Federal and State reports. Texas studies and reports reviewed included:

(1) A Study to Make Recommendations Regarding a Comprehensive State Occupational Education Program (commissioned by the State Board for Education and the Texas Education Agency, 1982).

(2) A Review of Governance and Management Practices in Texas Public Higher Education (Coopers and Lybrand, 1986).

(3) Report and Recommendations of the Governor's Task Force on Vocational Education, (a review of postsecondary technical education authorized by the Governor, 1988).

These studies were comprehensive. Collectively, they identified the lack of a unified or cohesive system of vocational/technical education in Texas, and the poor public image of vocational/technical education as problems.

Federal studies and reports reviewed for the TSTC study included the 1963, 1968 and 1976 national assessments of vocational education that were a mandated part of the Vocational Education Acts of those years. Also reviewed were the 1984 publication entitled Involvement in Learning: Realizing the Potential of American Higher Education and supporting studies. This publication resulted from a major study sponsored by the National Institute of Education.

The five volume final report resulting from the National Assessment of Vocational Education (NAVE) study, published in 1989, served as the primary resource document for this comparative analysis study. The NAVE study was mandated by Congress in 1984 to be completed prior to the reauthorization of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (Carl Perkins Act). Three different national data bases were utilized in the study: High School and Beyond, 1980; the National Longitudinal Survey of the Class of 1972; and the National Postsecondary Student Aid Survey, 1986. The final NAVE report was based upon numerous contracted research studies with oversight provided by a panel of national experts in technical education. Findings of the NAVE report were corroborated in a 1992 national study conducted by the Office of Research of the U. S. Department of Education entitled The Way We Were: The Community College as American Thermometer.

Outcomes of these studies revealed that while most students have access to higher education through two-year colleges, they do not stay in school long enough to receive in-depth technical education and training. This problem is particularly acute for minority students and students characterized by the "special population" categories in the Carl Perkins Act: educationally disadvantaged, economically disadvantaged, single parents, displaced homemaker, limited English proficiency, and handicapped. An increasing number of two-year college students were found to be "milling around" in college rather than completing a "coherent program of study." Only 19 percent of the high school students entering two-year colleges and majoring in vocational/technical programs were found to graduate with a certificate or an associate degree within four years after enrolling. Furthermore, those students who failed to complete did not gain measurable economic benefits including increased wages that result from completing a "coherent program of study."

Findings similar to the 1989 NAVE report were published in the early 1980s by Pincus, Grubb and Lombardi who called attention to the failure of students to graduate from two-year colleges. Since its publication, Grubb and others have elaborated on the findings in the NAVE report.

DATA COLLECTION, DATA TREATMENT AND ANALYSIS

The thesis of unnecessary program duplication between TSTC and the community/junior colleges was carefully studied by the Occupational and Institutional Research Division of TSTC. The data utilized for the study were obtained from published reports and official documents of the Texas Higher Education Coordinating Board (Coordinating Board) for the 1990-91 school year and for the 1990 Federal fiscal year. All enrollment data is based on "declared majors" in technical programs. Also, a list of the active Coordinating Board-approved vocational/technical programs was compiled according to the Texas HEGIS Code designation for each program. A data base of the information was compiled and an institutional curricula profile built for each two-year college.

The following is a list of reports and documents of the Texas Higher Education Coordinating Board utilized in this report:

(1) Vocational-Technical Degrees and Certificates Conferred By Major, Texas Public Community and Technical Colleges, Statewide Totals, Fiscal Year 1990-91, February 10, 1992.

(2) Vocational-Technical Degrees and Certificates Conferred By Major, Texas Public Community and Technical Colleges, By Campus, Fiscal Year 1990-91, February 10, 1992.

(3) Vocational-Technical Declared Majors, Texas Public Community and Technical Colleges, Fall Semesters 1990 and 1991, February 24, 1992.

(4) Texas Higher Education Coordinating Board Education and Training Clearinghouse Vocational and Technical Program Inventory by Institution Fall 1990, March 20, 1992.

(5) Vocational-Technical Contact Hours Generated In Semester Length Courses, Texas Public Community and Technical Colleges, Fall 1990, Spring 1991, Summer I and II, 1991.

(6) Formula Recommendation for the 1990-91 Biennium, March 7, 1988.

(7) Vocational Education Postsecondary Institutions (VEPSI) Report. Parts A through D, Summer II 1989 through Summer I 1990, May 20, 1992 (report received on diskette).

Definitions

Declared major - a student who has enrolled in a Texas Higher Education Coordinating Board-approved technical program and has stated the intent to complete courses that lead to an associate degree or certificate.

Key descriptive data - for the community/junior colleges and TSTC include the number of programs offered, enrollment and the number of graduates.

Performance indicators - for the purposes of the comparative analysis study, performance indicators for the community/junior colleges and TSTC are the "Graduate Percent Yield" and cost per graduate.

Institutional curricula profiles - for the community/junior colleges and TSTC contain the key descriptive data as distributed among the technical program clusters.

"Graduate Percent Yield" - for the community/junior colleges and TSTC is computed by dividing the annualized number of technical program cluster graduates (degree and certificate) by the technical program cluster enrollment of the previous fall term figure and multiplying by 100.

Cost per graduate - the state appropriated funding for fiscal year 1990-1991 as determined by the Texas Higher Education Coordinating Board formula divided by the total number of graduates. The cost per graduate is determined separately for the community/junior colleges and TSTC, and for each technical program cluster.

Special populations - is based on the federal statute and includes individuals with handicaps, educationally and economically disadvantaged individuals, individuals with limited English proficiency, individuals who participate in programs designed to eliminate sex bias, and individuals in correctional institutions.

Major metropolitan area institutions - for the purpose of this comparative analysis major metropolitan area institutions include those community/junior colleges located in Dallas/Fort Worth, Houston, San Antonio, Austin, El Paso, Beaumont-Port Arthur, and appropriate contiguous counties.

Balance of state institutions - for the purpose of this comparative analyis the balance of state institutions include all those community/junior colleges not located in the major metropolitan areas.

Technical Program Clusters

To facilitate data comparisons and to improve data integrity, Coordinating Board-approved technical programs were assigned to one of twelve primary program clusters which were identified based on the Texas Innovation Network System (TINS) list of emerging and

advanced technologies, and on generally understood and accepted program clusters or families of occupations. A complete listing of the programs within each technical program cluster is located in Appendix 1 (Volume II, page 2). The primary technical program clusters identified are listed below:

Medical/Health Care
Biotechnologies
Automotive/Heavy Mechanics
Building Systems & Construction
Applied Service & Business
Related Studies
Information
Energy & Environmental
Laser/Electronics
Manufacturing, Design & Engineering
Aerospace
Agribusiness

In addition, the terms "export-related" and "service-related" were used to classify the technical program clusters for comparative analysis.

"Export-Related" - This term or classification refers to those technical program clusters that most directly support the needs of businesses and industries which export goods and services for sale outside the state. These businesses and industries, and those programs which support them, have a multiplier effect in helping create wealth, thus improving the economy of the state. The technical programs assigned to the "export-related" classification are as follows:

Information
Energy & Environmental
Laser/Electronics
Manufacturing, Design & Engineering
Aerospace
Agribusiness

"Service-Related" - This term or classification refers to those technical program clusters which most directly impact businesses, industries, and public agencies and institutions which provide services primarily within the state, region or city. While important to the quality of life, service-related firms generally do little to directly improve the overall creation of wealth for a region or state. The technical programs assigned to the "service-related" classification are as follows:

Biotechnologies
Medical/Health Care
Automotive/Heavy Mechanics
Building Systems & Construction

Applied Service & Business
Related Instruction

Results

Results of the TSTC study are shown in issue-specific, disaggregated data tables located in Volume II-Appendices for various segments of the state and institutional groupings. The tables contain institutional descriptors and performance indicators supported by detail data compiled for each public two-year college. The data bases were compiled using dBase IV and subsequently queried using the same software program. Lotus 123 was also used to create selected tables. Each comparison is described in a separate section of the study. Tables containing information specific to each comparison are included in the appropriate sections. A list of the comparisons made between TSTC and the community/junior colleges follows:

(1) Institutional curricula profiles - compared by technical program clusters, "service-related" and "export-related" program clusters;

(2) "Graduate Percent Yield" - compared by technical program clusters, "service-related" and "export-related" program clusters;

(3) Graduates - compared by gender, ethnicity and special populations in total. Also compared by gender, ethnicity and special populations within technical program clusters, "service-related" and "export-related" program clusters;

(4) "Major metropolitan" area institutions, "balance of state" institutions and TSTC compared in terms of institutional curricula profiles, "Graduate Percent Yield," and graduates.

(5) Cost per graduate of the "major metropolitan" area institutions, "balance of state" institutions, all community/junior colleges and TSTC compared in turns of "service-related" and "export-related" clusters.

COMPARISON OF INSTITUTIONAL CURRICULA PROFILES FOR TSTC AND THE COMMUNITY/JUNIOR COLLEGES

The purpose of this section is to examine the curricula differences between TSTC and the community/junior colleges. The institutional curricula profiles of TSTC and the community/junior colleges were compared using technical program clusters and "service-related" versus "export-related" program clusters to determine if TSTC program offerings unnecessarily duplicate those of the community/junior colleges.

Definitions

Each technical program with a Texas HEGIS Code designation offered in Texas two-year public colleges was assigned to one of twelve technical program clusters (Volume II, Appendix 1, page 2). The twelve program clusters were derived from the TINS list of emerging and advanced technologies and on generally understood and accepted program clusters or families of occupations. An institutional curricula profile of technical program clusters was developed for each two-year public college and subsequently combined into composite profiles for the community/junior colleges and TSTC.

Findings

Appendix 2 (Volume II, page 9) contains composite information for the community/junior colleges and TSTC including the institutional curricula profiles. Table 1A on the following page is a consolidation of the information contained in both appendices and contains the institutional curricula profiles for the community/junior colleges and TSTC. The first column contains the titles of technical program clusters segregated into the "service-related" clusters listed in the top half of the table and the "export-related" clusters listed in the bottom half of the table. The second column contains the community/junior college data including number of programs, enrollment and graduates. The third column contains TSTC data including number of programs, enrollment and graduates.

Table 1A

Institutional Curricula Profiles for the Community/Junior Colleges and TSTC

	Community/Junior Colleges (65 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates
Service-Related Clusters						
Medical/Health Care	406	30,370	6,939	7	481	283
Biotechnologies	1	2	0	0	0	0
Automotive/Heavy Mechanics	104	2,175	665	13	827	340
Building Systems & Construction	92	2,428	371	8	470	161
Applied Service & Business	867	46,725	5,656	14	1,074	432
Related Instruction	49	0	2	4	0	0
****Subtotals****	1,519	81,700	13,633	46	2,852	1,216
Export-Related Clusters						
Information	162	13,727	1,457	13	1,207	287
Energy & Environmental	37	544	53	5	274	84
Laser/Electronics	106	6,205	1,014	14	1,541	402
Manufacturing, Design & Engineering	221	6,494	925	20	1,316	435
Aerospace	40	1,270	227	4	627	114
Agribusiness	57	875	250	5	253	107
****Subtotals****	623	29,115	3,926	61	5,218	1,429
******Grand Totals******	2,142	110,815	17,559	107	8,070	2,645

It is evident from the data that TSTC has a different institutional curricula profile from the community/junior colleges. Table 1B contains the same information as Table 1A except percentages were used to facilitate the comparison between TSTC and the community/junior colleges.

Table 1B

Institutional Curricula Profiles for the Community/Junior Colleges and TSTC by Percentage

	Community/Junior Colleges (65 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)
Service-Related Clusters						
Medical/Health Care	18.95	27.41	39.52	6.54	5.96	10.70
Biotechnologies	0.05	N/A	N/A	N/A	N/A	N/A
Automotive/Heavy Mechanics	4.86	1.96	3.79	12.15	10.25	12.85
Building Systems & Construction	4.30	2.19	2.11	7.48	5.82	6.09
Applied Service & Business	40.48	42.16	32.21	13.08	13.31	16.33
Related Instruction	2.29	N/A	0.01	3.74	N/A	N/A
****Subtotals****	70.92	73.73	77.64	42.99	35.34	45.97
Export-Related Clusters						
Information	7.56	12.39	8.30	12.15	14.96	10.85
Energy & Environmental	1.73	0.49	0.30	4.67	3.40	3.17
Laser/Electronics	4.95	5.60	5.77	13.08	19.10	15.20
Manufacturing, Design & Engineering	10.30	5.86	5.28	18.69	16.31	16.45
Aerospace	1.87	1.15	1.29	3.74	7.77	4.31
Agribusiness	2.66	0.79	1.42	4.67	3.12	4.05
****Subtotals****	29.08	26.27	22.36	57.01	64.66	54.03
******Grand Totals******	100.00	100.00	100.00	100.00	100.00	100.00

The most visible difference was that the majority (59%) of all technical programs offered by the community/junior colleges are in only two of the twelve technical program clusters--Medical/Health Care and Applied Service & Business. The concentration in these cluster areas was also found in the enrollment (69% for Fall 1990) and graduates (72% for fiscal year 1990-1991). When combined with the other four technical program clusters under the rubric "service-related" technical program clusters, this area accounted for 71 percent of the programs offered, 74 percent of the enrollments, and 78 percent of the graduates for the community/junior colleges.

For TSTC, there were no two or three dominant technical program clusters. However, where the community/junior college concentration was in the "service-related" technical program clusters, TSTC concentration was in the "export-related" technical program clusters. This area accounted for 57 percent of the programs offered, 65 percent of the enrollment and 54 percent of the graduates for TSTC.

Summary Observations

The institutional curricula profile for TSTC is significantly different from that of the community/junior colleges. The institutional curricula profile for the community/junior colleges is strongly biased toward those technical programs supportive of "service-related" businesses and industries. In contrast, TSTC has a greater percentage of its efforts in support of the "export-related" businesses and industries. These curricula or program findings affirm that TSTC with its unique curricula profile substantially met the mandated role and mission as established by the Legislature.

COMPARISON OF THE "GRADUATE PERCENT YIELD" OR STUDENT SUCCESS RATE FOR TSTC AND THE COMMUNITY/JUNIOR COLLEGES

The purpose of this section was to examine and compare the "Graduate Percent Yield" or student completion rate of TSTC and the community/junior colleges (Volume II, Appendix 2, page 9). The Fall 1990 enrollment, the 1990-91 graduates and the "Graduate Percent Yield" were compared using the technical program clusters and "service-related" versus "export-related" program clusters to determine if there were differences in the graduation rate of students completing a "coherent program of study" from TSTC as compared to the graduation rate of students attending a community/junior college.

Definitions

The most important measurable outcome of an educational institution is its graduates. While it may be difficult to achieve a generally accepted measure of comparative quality or competence of graduates, it is possible for institutions to determine the number of graduates from each program and the number of students enrolled. Comparative student success in this study was measured by a computed percentage or index figure called the "Graduate Percent Yield." The "Graduate Percent Yield" was computed by dividing the annualized number of technical program cluster graduates (degree and certificate) by the technical program cluster enrollment figure from the previous fall term and multiplying by 100.

Findings

Table 2 on the following page contains the enrollments, the number of graduates, and "Graduate Percent Yield" for each technical program cluster and for the "service-related" and "export-related" clusters for the community/junior colleges and TSTC. The first column contains the technical program clusters within the "service-related" and "export-related" clusters. The second column contains the community/junior college data including enrollments, graduates and "Graduate Percent Yield" for each technical program cluster. The third column contains TSTC data including enrollment, graduates and "Graduate Percent Yield" for each technical program cluster.

Table 2

"Graduate Percent Yield" for TSTC and the Community/Junior Colleges

	Community/Junior Colleges (65 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)
Service-Related Clusters						
Medical/Health Care	30,370	6,939	22.85	481	283	58.84
Biotechnologies	2	0	0.00	0	0	0.00
Automotive/Heavy Mechanics	2,175	665	30.57	827	340	41.11
Building Systems & Construction	2,428	371	15.28	470	161	34.26
Applied Service & Business	46,725	5,656	12.10	1,074	432	40.22
Related Instruction	0	2	N/A	0	0	N/A
****Subtotals****	81,700	13,633	16.69	2,852	1,216	42.64
Export-Related Clusters						
Information	13,727	1,457	10.61	1,207	287	23.78
Energy & Environmental	544	53	9.74	274	84	30.66
Laser/Electronics	6,205	1,014	16.34	1,541	402	26.09
Manufacturing, Design & Engineering	6,494	925	14.24	1,316	435	33.05
Aerospace	1,270	227	17.87	627	114	18.18
Agribusiness	875	250	28.57	253	107	42.29
****Subtotals****	29,115	3,926	13.48	5,218	1,429	27.39
******Grand Totals******	110,815	17,559	15.85	8,070	2,645	32.78

The total "Graduate Percent Yield" for the community/junior colleges was 16 percent. Although the community/junior college program emphasis was determined to be in the "service-related" technical program clusters, the "Graduate Percent Yield" for this area was 17 percent. The two highest "Graduate Percent Yields" for the community/junior colleges were Automotive/Heavy Mechanics (31%) and Agribusiness (29%).

The total "Graduate Percent Yield" for TSTC was 33 percent, twice that of the community/junior colleges. For every applicable technical program cluster, TSTC had a

higher "Graduate Percent Yield" than the community/junior colleges. Those programs with the highest "Graduate Percent Yield" for TSTC were:

Medical/Health Care (59%),
Agribusiness (42%),
Automotive/Heavy Mechanics (41%),
Applied Service & Business (40%), and
Building Systems & Construction (34%).

TSTC had a 43 percent "Graduate Percent Yield" for the "service-related" technical program clusters and a 27 percent "Graduate Percent Yield" for the "export-related" technical program clusters as compared to a 17 percent and 13 percent respectively for the community/junior colleges.

Summary Observations

TSTC had a significantly better success rate than the community/junior colleges in having students complete a "coherent program of study" as identified in the NAVE research report (pg. 4). The higher graduation success rate can largely be attributed to the following TSTC characteristics:

(1) the intensity of instruction requiring students to be in class and laboratory 25 to 30 hours a week;

(2) the integration of the theoretical and academic with applied and laboratory-based learning;

(3) the involvement of the faculty with each student in the classroom and the laboratory;

(4) the residential nature of the campuses permitting students to attend full-time; and

(5) a highly structured curriculum with few options encouraging students to keep on-track.

From an overall assessment by the number of programs offered, students enrolled, students graduated annually, and "Graduate Percent Yield," the Medical/Health Care technical program cluster offers the most effective and most efficient model for emulation by two-year public colleges. TSTC curricula design, instructional strategies and student-required extensive laboratory experience utilized for all technical programs for over 20 years closely parallels the medical/health care model.

COMPARATIVE ANALYSIS OF PROGRAM GRADUATE DATA BASED ON GENDER, ETHNICITY AND SPECIAL POPULATION CATEGORIES

The purpose of this section was to compare the graduation of various ethnic and special population students from TSTC and the community/junior colleges. The data utilized in the comparison was the Vocational Education Postsecondary Institutions Report (VEPSI) for the period July 1989 through June 1990 (Volume II, Appendix 4, page 113.) There were four separate analyses performed to determine the success or graduation rate of the various ethnic and special population students completing a "coherent program of study:"

(1) graduates statewide,
(2) graduates by institution,
(3) graduates by "service-related" and "export-related" program clusters, and
(4) graduates by specific technical program clusters.

Definitions

The term "special population" used in this section and on the data tables in Volume II-Appendices is based on the federal statute (Definitions, page 6). Each of the terms are defined as follows:

> "Disadvantaged" means individuals (other than individuals with handicaps) who have economic or academic disadvantages and who require special services and assistance in order to enable them to succeed in technical programs.
>
> "Displaced Homemaker" means an adult who has worked without remuneration to care for the home and family, and for that reason has diminished marketable skills; has been dependent upon public assistance or the income of a relative but is no longer supported by such income; is a parent whose youngest child will become ineligible to receive assistance; and is unemployed or underemployed and is experiencing difficulty in obtaining any employment or suitable employment.
>
> "Handicapped" means any individual who has any disability as defined in Section 3(2) of the Americans with Disabilities Act of 1990.
>
> "Limited English Proficiency" means someone with minimal communication skills (e.g., writing, reading, speaking) limiting employment opportunity and as defined in Section 703(a)(1) of the Elementary and Secondary Education Act of 1965.

"Single Parent" means an individual who is unmarried or legally separated from a spouse and has a minor child for which the parent has either custody or joint custody or is pregnant.

Findings

Graduates Statewide.

Table 3 contains the statewide and two-year college graduate information by gender and ethnicity. The first column contains the classification of graduates by gender and ethnicity. The second column contains the statewide number and percentage of graduates for each classification. The third column contains the community/junior college number and percentage of graduates as a portion of the state total of graduates in each classification. The fourth column contains the TSTC number and percentage of graduates as a portion of the state total of graduates in each classification.

Table 3

Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges

	Statewide	Community/ Junior Colleges (65 Campuses)	TSTC (4 Campuses)
Classification	Total Graduates	Total Graduates	Total Graduates
Graduates	21,453	18,830	2,623
Percent (%) Graduates	100.00	87.77	12.23
Males	9,422	7,480	1,942
Percent (%) Males	100.00	79.39	20.61
Females	12,031	11,350	681
Percent (%) Females	100.00	94.34	5.66
Black	2,385	2,265	120
Percent (%) Black	100.00	94.97	5.03
Hispanic	4,291	3,427	864
Percent (%) Hispanic	100.00	79.86	20.14
White	14,191	12,586	1,605
Percent (%) White	100.00	88.69	11.31
Other Ethnicity	586	552	34
Percent (%) Other	100.00	94.20	5.80

The 65 campuses of the community/junior colleges accounted for 88 percent of the technical graduates in the state--79 percent of the male and 94 percent of the female. Based on ethnicity, the community/junior colleges graduated:

80 percent of the Hispanic graduates,
95 percent of the Black graduates,
89 percent of the White graduates, and
94 percent of the graduates of other ethnicity (Indian and Asian).

TSTC, with its four campuses, accounted for 12 percent of all technical graduates in Texas--21 percent of all male graduates and 6 percent of all female graduates. Based on ethnicity, TSTC graduated:

20 percent of the Hispanic graduates,
5 percent of the Black graduates,
11 percent of the White graduates, and
6 percent of the graduates of other ethnicity (Indian and Asian).

Table 4 contains the statewide and two-year college graduates by special population category. The first column contains a list of special population categories. The second column contains the statewide number and percentage of graduates classified by each of the special population categories. The third column contains the number and percentage of the state total for the community/junior college graduates classified by each special population category. The fourth column contains the number and percentage of the state total for the TSTC graduates classified by each special population category.

Table 4

*Total Graduates by Special Population Categories During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges**

	Statewide	Community/ Junior Colleges (65 Campuses)	TSTC (4 Campuses)
Special Population Category	Total Graduates	Total Graduates	Total Graduates
Handicapped	1,221	732	489
Percent (%) Handicapped	100.00	59.95	40.05
Limited English Proficiency	1,187	909	278
Percent (%) Limited English Proficiency	100.00	76.58	23.42
Disadvantaged	8,777	6,720	2,057
Percent (%) Disadvantaged	100.00	76.56	23.44
Single Parent	1,652	1,450	202
Percent (%) Single Parent	100.00	87.77	12.23
Sex Bias	1,467	1,123	344
Percent (%) Sex Bias	100.00	76.55	23.45

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category.

From a statewide perspective, TSTC graduated the following percentages of graduates based on special population categories:

40 percent of the "Handicapped" graduates,
23 percent of the "Limited English Proficiency" graduates,
23 percent of the "Disadvantaged" graduates,
12 percent of the "Single Parent" graduates, and
23 percent of the "Sex Bias" graduates.

The community/junior colleges graduated the following percentages of graduates based on special population categories:

60 percent of the "Handicapped" graduates,
77 percent of the "Limited English Proficiency" graduates,
77 percent of the "Disadvantaged" graduates,
88 percent of the "Single Parent" graduates, and
77 percent of the "Sex Bias" graduates.

Although the community/junior colleges dominated in total number of graduates, TSTC graduates represented a large portion of the graduates identified by special population categories, especially in the "Handicapped" classification where 40 percent of the statewide total graduated from TSTC. Also, in the "Limited English Proficiency," "Disadvantaged" and "Sex Bias" classifications, more than one-fifth of the statewide graduates in each classification graduated from TSTC. These numbers become even more impressive because TSTC, with its four campuses represents only 6 percent of the two-year postsecondary campuses in Texas.

Graduates by Institution.

Table 5 contains a comparison of graduate data on gender and ethnicity for the community/junior colleges and TSTC. The first column contains the classification of graduates by gender and ethnicity. The second column contains the community/junior college number and percentage of graduates in each classification. The third column contains the number and percentage of TSTC graduates in each classification.

Table 5

TSTC and Community/Junior College Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990

Classification	Community/Junior College Graduates (65 Campuses)	TSTC Graduates (4 Campuses)
Graduates	18,830	2,623
Percent (%) Graduates	100.00	100.00
Males	7,480	1,942
Percent (%) Males	39.72	74.04
Females	11,350	681
Percent (%) Females	60.28	25.96
Black	2,265	120
Percent (%) Black	12.03	4.57
Hispanic	3,427	864
Percent (%) Hispanic	18.20	32.94
White	12,586	1,605
Percent (%) White	66.84	61.19
Other Ethnicity	552	34
Percent (%) Other	2.93	1.30

The community/junior college graduate profile showed 40 percent of their graduates as male and 60 percent of their graduates as female. Based on ethnicity, the community/junior college graduates were represented as follows:

67 percent White,
18 percent Hispanic,
12 percent Black, and
3 percent other ethnicity (Indian and Asian).

TSTC's graduate profile showed 74 percent of its graduates as male and 26 percent of its graduates as female. Based on ethnicity, TSTC graduates were represented as follows:

61 percent White,
33 percent Hispanic,
5 percent Black, and
1 percent other ethnicity (Indian and Asian).

Table 6 contains a comparison of graduate data on gender and ethnicity for the community/junior colleges and TSTC. The first column contains a list of special population

categories. The second column contains the number and percentage of community/junior college graduates classified in each special population category. The third column contains the number and percentage of TSTC graduates classified in each special population category.

Table 6

*TSTC and Community/Junior College Graduates by Special Population Categories During the Period July 1989 Through June 1990**

Special Population Category	Community/Junior College Graduates (65 Campuses)	TSTC Graduates (4 Campuses)
Graduates	18,830	2,623
Handicapped	732	489
Percent (%) Handicapped	3.89	18.64
Limited English Proficiency	909	278
Percent (%) Limited English Proficiency	4.83	10.60
Disadvantaged	6,720	2,057
Percent (%) Disadvantaged	35.69	78.42
Single Parent	1,450	202
Percent (%) Single Parent	7.70	7.70
Sex Bias	1,123	344
Percent (%) Sex Bias	5.96	13.11

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category, therefore totals will not match.

The community/junior college special population graduate profile was as follows:

4 percent "Handicapped" graduates,
5 percent "Limited English Proficiency" graduates,
36 percent "Disadvantaged" graduates,
8 percent "Single Parent" graduates, and
6 percent "Sex Bias" graduates.

In comparison, the TSTC special population graduate profile was as follows:

19 percent "Handicapped" graduates,
11 percent "Limited English Proficiency" graduates,
78 percent "Disadvantaged" graduates,
8 percent "Single Parent" graduates, and
13 percent "Sex Bias" graduates.

In summary, TSTC had a significantly different institutional graduate profile from the community/junior colleges when considered from the percentage of special population graduates in each institution as compared to the total number of graduates. For example, the percentage of graduates classified as "Handicapped" was nearly five times greater for TSTC (19%) than for the community/junior colleges (4%). For "Disadvantaged" graduates, the difference was more than two times greater for TSTC (78%) as compared to the community/junior colleges (36%).

Graduates by "Service-Related" and "Export-Related" Program Clusters.

Table 7 contains the statewide and two-year college graduate information by gender and ethnicity based on "service-related" and "export-related" technical program clusters. The first column contains the classification of graduates by gender and ethnicity. The second column contains the statewide number and percentage of graduates in each classification within the "service-related" and "export-related" technical program clusters. The third column contains the community/junior colleges number and percentage of graduates as a portion of the state total of graduates in each classification within the "service-related" and "export-related" technical program clusters. The fourth column contains the TSTC number and percentage of graduates as a portion of the state total of graduates in each classification within the "service-related" and "export-related" technical program clusters.

Table 7

Total Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in the "Service-Related" and "Export-Related" Technical Program Clusters

	Statewide Graduates by Cluster		Community/Junior College Graduates (65 Campuses)		TSTC Graduates (4 Campuses)	
Classification	Service-Related Clusters	Export-Related Clusters	Service-Related Clusters	Export-Related Clusters	Service-Related Clusters	Export-Related Clusters
Graduates	15,805	5,648	14,556	4,274	1,249	1,374
Percent (%) Graduates	100.00	100.00	92.10	75.67	7.90	24.33
Males	5,184	4,238	4,388	3,092	796	1,146
Percent (%) Males	100.00	100.00	84.65	72.96	15.35	27.04
Females	10,621	1,410	10,168	1,182	453	228
Percent (%) Females	100.00	100.00	95.73	83.83	4.27	16.17
Black	1,808	577	1,768	497	40	80
Percent (%) Black	100.00	100.00	97.79	86.14	2.21	13.86
Hispanic	3,224	1,067	2,665	762	559	305
Percent (%) Hispanic	100.00	100.00	82.66	71.42	17.34	28.58
White	10,422	3,769	9,779	2,807	643	962
Percent (%) White	100.00	100.00	93.83	74.48	6.17	25.52
Other Ethnicity	351	235	344	208	7	27
Percent (%) Other	100.00	100.00	98.01	88.51	1.99	11.49

For the "service-related" technical program clusters, the community/junior colleges graduated 92 percent of the statewide graduates--85 percent of the male graduates and 96 percent of the female graduates. Based on ethnicity, the community/junior colleges graduated:

98 percent of the Black graduates,
83 percent of the Hispanic graduates,
94 percent of the White graduates, and
98 percent of the graduates of other ethnicity (Indian and Asian).

TSTC accounted for 8 percent of the statewide total--15 percent of the male graduates and 4 percent of the female graduates. Based on ethnicity, TSTC graduated:

2 percent of the Black graduates,
17 percent of the Hispanic graduates,

6 percent of the White graduates, and
2 percent of the graduates of other ethnicity (Indian and Asian).

In contrast, the community/junior colleges accounted for 76 percent of the statewide graduates in the "export-related" technical program clusters--73 percent of the males and 84 percent of the females. Based on ethnicity, the community/junior colleges graduated:

86 percent of the Black graduates,
71 percent of the Hispanic graduates,
74 percent of the White graduates, and
89 percent of the graduates of other ethnicity (Indian and Asian).

For the "export-related" technical program clusters, TSTC graduated 24 percent of the statewide graduates--27 percent of the male graduates and 16 percent of the female graduates. Based on ethnicity, TSTC graduated:

14 percent of the Black graduates,
29 percent of the Hispanic graduates,
26 percent of the White graduates, and
11 percent of the graduates of other ethnicity (Indian and Asian).

Table 8 contains the statewide and two-year college graduates by special population category for the "service-related" and "export-related" technical program clusters. The first column contains a list of special population categories. The second column contains the statewide number and percentage of graduates classified by each of the special population categories within the "service-related" and "export-related" clusters. The third column contains the number and percentage of graduates as a portion of the state total for the community/junior college graduates classified by each special population category within the "service-related" and "export-related" clusters. The fourth column contains the number and percentage of graduates as a portion of the state total for the TSTC graduates classified by each special population category within the "service-related" and "export-related" clusters.

Table 8

*Total Graduates by Special Population Categories During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in the "Service-Related" and "Export-Related" Technical Program Clusters**

	Statewide Graduates by Cluster		Community/Junior College Graduates (65 Campuses)		TSTC Graduates (4 Campuses)	
Special Population Category	Service-Related Clusters	Export-Related Clusters	Service-Related Clusters	Export-Related Clusters	Service-Related Clusters	Export-Related Clusters
Handicapped	664	557	512	220	152	337
Percent (%) Handicapped	100.00	100.00	77.11	39.50	22.89	60.50
Limited English Proficiency	830	357	647	262	183	95
Percent (%) Limited English Proficiency	100.00	100.00	77.95	73.39	22.05	26.61
Disadvantaged	6,079	2,698	5,145	1,575	934	1,123
Percent (%) Disadvantaged	100.00	100.00	84.64	58.38	15.36	41.62
Single Parent	1,309	343	1,228	222	81	121
Percent (%) Single Parent	100.00	100.00	93.81	64.72	6.19	35.28
Sex Bias	964	503	812	311	152	192
Percent (%) Sex Bias	100.00	100.00	84.23	61.83	15.77	38.17

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category.

In the "service-related" program clusters, the community/junior colleges graduated the following statewide percentages:

77 percent of the "Handicapped" graduates,
78 percent of the "Limited English Proficiency" graduates,
85 percent of the "Disadvantaged" graduates,
94 percent of the "Single Parent" graduates, and
84 percent of the "Sex Bias" graduates.

TSTC graduated the following statewide percentages:

23 percent of the "Handicapped" graduates,
22 percent of the "Limited English Proficiency" graduates,
15 percent of the "Disadvantaged" graduates,
6 percent of the "Single Parent" graduates, and
16 percent of the "Sex Bias" graduates.

In the "export-related" programs, the community/junior colleges graduated the following percentages of statewide graduates:

39 percent of the "Handicapped" graduates,
73 percent of the "Limited English Proficiency" graduates,
58 percent of the "Disadvantaged" graduates,
65 percent of the "Single Parent" graduates, and
62 percent of the "Sex Bias" graduates.

TSTC graduated the following percentages of statewide graduates:

61 percent of the "Handicapped" graduates,
27 percent of the "Limited English Proficiency" graduates,
42 percent of the "Disadvantaged" graduates,
35 percent of the "Single Parent" graduates, and
38 percent of the "Sex Bias" graduates.

Again, the community/junior colleges dominated in total number of graduates, especially in the "service-related" technical program clusters. However, within the special population categories of "Handicapped" and "Limited English Proficiency," TSTC graduated more than one-fifth of the graduates within each of the categories for the "service-related" technical program clusters. TSTC graduates represented a significant portion of the graduates within the "export-related" technical program clusters, particularly within the special population categories. More than one-half of the state graduates who classified as "Handicapped" graduated from TSTC. Also, 42 percent of the total statewide graduates who classified as "Disadvantaged" graduated from TSTC. TSTC graduated more than one-third of the "Single Parent" and "Sex Bias" graduates in the state.

Graduates by Specific Technical Program Clusters.

At the specific program level under the "service-related" and "export-related" clusters, TSTC graduates represented a substantial portion of the total number of graduates statewide. Tables 9 through 12B contain information on graduates by gender, ethnicity and special population categories for TSTC and the community/junior colleges for specific programs within the "service-related" and "export-related" technical program clusters. Table 9 contains information by gender and ethnicity for the Automotive/Heavy Mechanics and Building Systems & Construction programs under the rubric of "service-related" clusters. The table is tiered, with the statewide numbers appearing at the top, the community/junior college numbers and percentages of the state total appearing in the middle, and the TSTC numbers and percentages of the state total appearing at the bottom. The first column contains the program clusters within the designation of statewide, community/junior colleges

and TSTC. The second column contains the total number of graduates by program cluster for the state, the community/junior colleges and TSTC. The third and fourth columns contain the gender data by program cluster for the state, the community/junior colleges and TSTC. Columns five through eight contain the ethnicity data by program cluster for the state, the community/junior colleges and TSTC.

Table 9

Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in Specific "Service-Related" Technical Program Clusters

Statewide Graduates	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Automotive/Heavy Mechanics	1,009	996	13	146	285	554	24
Building Systems & Construction	687	682	5	72	191	412	12
Community/Junior Colleges (65 Campuses)	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Automotive/Heavy Mechanics	703	692	11	142	163	376	22
Percent (%) Graduates	69.67	69.48	84.62	97.26	57.19	67.87	91.67
Building Systems & Construction	456	453	3	63	105	278	10
Percent (%) Graduates	66.38	66.42	60.00	87.50	54.97	67.48	83.33
TSTC (4 Campuses)	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Automotive/Heavy Mechanics	306	304	2	4	122	178	2
Percent (%) Graduates	30.33	30.52	15.38	2.74	42.81	32.13	8.33
Building Systems & Construction	231	229	2	9	86	134	2
Percent (%) Graduates	33.62	33.58	40.00	12.50	45.03	32.52	16.67

For the Automotive/Heavy Mechanics cluster under "service-related" technical program clusters, TSTC graduated 30 percent of all the graduates and 43 percent of all Hispanic graduates in Texas. In the Building Systems & Construction cluster, TSTC graduated:

34 percent of all the graduates,
40 percent of the female graduates, and
45 percent of all Hispanic graduates.

Table 10 contains special population graduate data in the Automotive/Heavy Mechanics and Building Systems & Construction programs under "service-related" clusters. The table is tiered, with the statewide numbers appearing at the top, the community/junior college numbers and percentages appearing in the middle and TSTC numbers and percentages appearing at the bottom. The first column contains the program names within the designations of statewide, community/junior colleges and TSTC. Columns two through six contain the special population numbers and percentages by program for the state, community/junior colleges and TSTC.

Table 10

*Graduates by Special Population Categories During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in Specific "Service-Related" Technical Program Clusters**

Statewide Graduates	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Automotive/Heavy Mechanics	93	69	560	37	10
Building Systems & Construction	53	82	357	27	8
Community/Junior Colleges (65 Campuses)	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Automotive/Heavy Mechanics	52	46	311	22	7
Percent (%) Graduates	55.91	66.67	55.54	59.46	70.00
Building Systems & Construction	16	47	192	18	1
Percent (%) Graduates	30.19	57.32	53.78	66.67	12.50
TSTC (4 Campuses)	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Automotive/Heavy Mechanics	41	23	249	15	3
Percent (%) Graduates	44.09	33.33	44.46	40.54	30.00
Building Systems & Construction	37	35	165	9	7
Percent (%) Graduates	69.81	42.68	46.22	33.33	87.50

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category.

For the Automotive/Heavy Mechanics cluster, TSTC graduated:

44 percent of the "Handicapped" graduates,
33 percent of the "Limited English Proficiency" graduates,
44 percent of the "Disadvantaged" graduates,
41 percent of the "Single Parent" graduates, and
30 percent of the "Sex Bias" graduates.

In the Building Systems & Construction cluster, TSTC graduated:

70 percent of the "Handicapped" graduates,
43 percent of the "Limited English Proficiency" graduates,
46 percent of the "Disadvantaged" graduates,
33 percent of the "Single Parent" graduates, and
88 percent of the "Sex Bias" graduates.

TSTC produced a major portion of the graduates in these two "service-related" program clusters given the fact that TSTC offers 11 percent of the Automotive/Heavy Mechanics and 8 percent of the Building Systems & Construction programs in the state. The TSTC graduation numbers for Building Systems & Construction were especially impressive in the special population categories where the majority of the statewide "Sex Bias" and "Handicapped" graduates were TSTC students.

Tables 11A and 11B contain graduate data by gender and ethnicity for specific program clusters under "export-related" technical program clusters. Both tables are tiered, with the statewide information appearing at the top, the community/junior college information appearing in the middle and TSTC information appearing at the bottom. The first column in each table contains the program names within the designations of statewide, community/junior college and TSTC. The second column in each table contains the number of graduates by program for the state and the numbers and percentages of graduates by program for the community/junior colleges and TSTC. Columns three and four in each table contain the gender data by program for the state, community/junior colleges and TSTC. Columns five through eight in each table contain the ethnicity data by program for the state, community/junior colleges and TSTC. Table 11A contains the data for the Energy & Environmental, Aerospace and Agribusiness clusters.

Table 11A

Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in Specific "Export-Related" Technical Program Clusters

Statewide Graduates	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Energy & Environmental	99	84	15	5	25	66	3
Aerospace	286	277	9	12	35	227	12
Agribusiness	380	292	88	38	51	286	5
Community/Junior Colleges (65 Campuses)	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Energy & Environmental	39	37	2	2	4	31	2
Percent (%) Graduates	39.39	44.05	13.33	40.00	16.00	46.97	66.67
Aerospace	178	170	8	8	24	139	7
Percent (%) Graduates	62.24	61.37	88.89	66.67	68.57	61.23	58.33
Agribusiness	270	205	65	34	27	205	4
Percent (%) Graduates	71.05	70.21	73.86	89.47	52.94	71.68	80.00
TSTC (4 Campuses)	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Energy & Environmental	60	47	13	3	21	35	1
Percent (%) Graduates	60.61	55.95	86.67	60.00	84.00	53.03	33.33
Aerospace	108	107	1	4	11	88	5
Percent (%) Graduates	37.76	38.63	11.11	33.33	31.43	38.77	41.67
Agribusiness	110	87	23	4	24	81	1
Percent (%) Graduates	28.95	29.79	26.14	10.53	47.06	28.32	20.00

In the Energy & Environmental program cluster, TSTC dominated the state by graduating:

61 percent of the total graduates,
87 percent of the female graduates,
84 percent of the Hispanic graduates, and
60 percent of the Black graduates.

In the Aerospace cluster, TSTC graduated:

38 percent of the total graduates,
33 percent of the Black graduates,

31 percent of the Hispanic graduates, and
42 percent of the graduates of other ethnicity (Indian and Asian).

In the Agribusiness cluster, TSTC graduated 47 percent of the Hispanics statewide.

Table 11B contains the data for the Laser/Electronics and Manufacturing, Design & Engineering clusters.

Table 11B

Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in Specific "Export-Related" Technical Program Clusters

Statewide Graduates	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Laser/Electronics	1,367	1,255	112	104	219	976	68
Manufacturing, Design & Engineering	1,665	1,401	264	166	289	1,127	83
Community/Junior Colleges (65 Campuses)	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Laser/Electronics	995	914	81	84	150	700	61
Percent (%) Graduates	72.79	72.83	72.32	80.77	68.49	71.72	89.71
Manufacturing, Design & Engineering	1,224	988	236	132	204	814	74
Percent (%) Graduates	73.51	70.52	89.39	79.52	70.59	72.23	89.16
TSTC (4 Campuses)	Total Graduates	Males	Females	Black	Hispanic	White	Other Ethnicity
Laser/Electronics	372	341	31	20	69	276	7
Percent (%) Graduates	27.21	27.17	27.68	19.23	31.51	28.28	10.29
Manufacturing, Design & Engineering	441	413	28	34	85	313	9
Percent (%) Graduates	26.49	29.48	10.61	20.48	29.41	27.78	10.84

For the Laser/Electronics cluster, TSTC graduated:

27 percent of the total graduates,
28 percent of the female graduates,
19 percent of the Black graduates, and
32 percent of the Hispanic graduates.

In the Manufacturing, Design & Engineering cluster, TSTC graduated:

26 percent of the total graduates,
11 percent of the female graduates,
20 percent of the Black graduates, and
29 percent of the Hispanic graduates.

Tables 12A and 12B contain graduate data by special population categories for specific program clusters under "export-related" technical program clusters. Both tables are tiered, with the statewide information appearing at the top, the community/junior college information appearing in the middle and TSTC information appearing at the bottom. The first column in each table contains the program names within the designations of statewide, community/junior college and TSTC. Columns two through six in each table contain the special population numbers and percentages by program for the state, community/junior colleges and TSTC. Table 12A contains the data for the Energy & Environmental, Aerospace and Agribusiness clusters.

Table 12A

*Graduates by Special Population Categories During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in Specific "Export-Related" Technical Program Clusters**

Statewide Graduates	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Energy & Environmental	12	16	73	6	24
Aerospace	16	5	138	4	9
Agribusiness	45	12	183	31	32
Community/Junior Colleges (65 Campuses)	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Energy & Environmental	0	4	16	0	0
Percent (%) Graduates	0.00	25.00	21.92	0.00	0.00
Aerospace	1	3	49	1	5
Percent (%) Graduates	6.25	60.00	35.51	25.00	55.56
Agribusiness	15	8	103	12	21
Percent (%) Graduates	33.33	66.67	56.28	38.71	65.63
TSTC (4 Campuses)	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Energy & Environmental	12	12	57	6	24
Percent (%) Graduates	100.00	75.00	78.08	100.00	100.00
Aerospace	15	2	89	3	4
Percent (%) Graduates	93.75	40.00	64.49	75.00	44.44
Agribusiness	30	4	80	19	11
Percent (%) Graduates	66.67	33.33	43.72	61.29	34.37

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category.

In the Energy & Environmental cluster, TSTC dominated the state by graduating 100 percent of all the graduates classified as "Handicapped," "Single Parent," and "Sex Bias." TSTC also graduated 78 percent of all the "Disadvantaged" graduates and 75 percent of all the "Limited English Proficiency" graduates in this cluster. In the Aerospace cluster, TSTC graduated:

94 percent of the "Handicapped" graduates,
75 percent of the "Single Parent" graduates,
64 percent of the "Disadvantaged" graduates,
44 percent of the "Sex Bias" graduates, and
40 percent of the "Limited English Proficiency" graduates.

For the Agribusiness cluster, TSTC graduated:

67 percent of the "Handicapped" graduates,
61 percent of the "Single Parent" graduates,
44 percent of the "Disadvantaged" graduates,
34 percent of the "Sex Bias" graduates, and
33 percent of the "Limited English Proficiency" graduates.

Table 12B contains the data for the Laser/Electronics and Manufacturing, Design & Engineering clusters.

Table 12B

*Graduates by Special Population Categories During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges in Specific "Export-Related" Technical Program Clusters**

Statewide Graduates	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Laser/Electronics	132	71	609	67	100
Manufacturing, Design & Engineering	209	114	811	91	136
Community/Junior Colleges (65 Campuses)	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Laser/Electronics	49	52	308	43	46
	37.12	73.24	50.57	64.18	46.00
Manufacturing, Design & Engineering	58	89	453	59	104
	27.75	78.07	55.86	64.84	76.47
TSTC (4 Campuses)	Handicapped	Limited English Proficiency	Disadvantaged	Single Parent	Sex Bias
Laser/Electronics	83	19	301	24	54
	62.88	26.76	49.43	35.82	54.00
Manufacturing, Design & Engineering	151	25	358	32	32
	72.25	21.93	44.14	35.16	23.53

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category.

In the Laser/Electronics cluster, TSTC graduated:

63 percent of the "Handicapped" graduates,
54 percent of the "Sex Bias" graduates,
36 percent of the "Single Parent" graduates, and
49 percent of the "Disadvantaged" graduates.

For the Manufacturing, Design & Engineering cluster, TSTC graduated:

72 percent of the "Handicapped" graduates,
44 percent of the "Disadvantaged" graduates, and
35 percent of the "Single Parent" graduates.

In the "export-related" clusters, TSTC graduated a significant portion of the statewide graduates. TSTC offers only 9 percent of the programs statewide in this area, making the numbers of graduates and percentages of special population graduates from the college even more impressive.

Summary Observations

For the ethnic minorities and special population students attending Texas two-year colleges, TSTC had a phenomenal success rate in having students complete a "coherent program of study" and graduate. The student completion rate is especially pronounced for special population students enrolled in the "export-related" technical programs. Particularly important to note is that the "export-related" technical programs are generally considered the most difficult requiring more math and science. Given the importance of math and science, the comparatively higher graduation rate of TSTC becomes even more impressive when one considers the fact that each of the four TSTC campuses ranked in the bottom six institutions among all public two-year colleges based on the tested ability of entering students to pass all or part of the TASP test makes the comparatively higher graduation rate of TSTC even more impressive. TSTC's high success rate can be attributed to the five characteristics of TSTC:

(1) the intensity of instruction requiring students to be in class and laboratory 25 to 30 hours a week;

(2) the integration of the theoretical and academic applications in applied and laboratory-based learning;

(3) the involvement of the faculty with each student in the classroom and the laboratory;

(4) the residential nature of the campuses, permitting students to attend full-time; and

(5) a highly structured curriculum with few options, encouraging students to keep on-track.

Many ethnic minorities and special population students require special services and assistance in order to enable them to succeed in technical programs. A supportive learning environment is needed to provide each student a reasonable expectation of success and

instructional alternatives to the traditional classroom. Historically, TSTC has exemplified such a positive learning environment and has provided a laboratory or "hands on" learning alternative to the traditional classroom.

COMPARISON OF INSTITUTIONAL CURRICULA PROFILES, "GRADUATE PERCENT YIELDS," AND GRADUATES FOR THE "MAJOR METROPOLITAN" AREA AND THE "BALANCE OF STATE" COMMUNITY/JUNIOR COLLEGES AND TSTC

The purpose of this section was to examine and compare the differences between "major metropolitan" area community/junior colleges, the "balance of state" community/junior colleges and TSTC. There were three analyses performed:

(1) institutional curricula profiles - compared by technical program clusters, "service-related" clusters and "export-related" clusters;

(2) "Graduate Percent Yield" - compared by technical program clusters, "service-related" clusters and "export-related" clusters; and

(3) graduates - compared by gender, ethnicity and special populations in total.

The analyses were performed to determine the differences, if any, between the community/junior colleges located in the major metropolitan areas of the state and the other community/junior colleges and TSTC which are located in other less populated areas of Texas.

Definitions

For the purposes of this study, "major metropolitan" and "balance of state" have been defined as follows:

> "Major metropolitan" area refers to those community/junior colleges (29 campuses) located in the five major metropolitan areas and Beaumont-Port Arthur, along with the appropriate contiguous counties:

Austin	Travis County
El Paso	El Paso County
Fort Worth/Dallas	Collin, Dallas, Denton and Tarrant Counties
Houston	Brazoria, Fort Bend, Galveston, Harris, and Montgomery Counties
San Antonio	Bexar County
Beaumont-Port Arthur	Hardin, Jefferson and Orange Counties

The basis for separating the community/junior colleges into "major metropolitan" area and "balance of state" was that the largest community/junior colleges, in terms of enrollment and number of programs offered, are located in the "major metropolitan" areas.

The larger institutions generally have a greater population base from which to draw resources (e.g., larger tax base) and enroll more students.

"Balance of state" refers to those community/junior colleges (36 campuses) located in the 239 counties not associated with a "major metropolitan" area. The institutions located in the "balance of state" are smaller than those community/junior colleges located in the "major metropolitan" areas. Because of the smaller population base, the "balance of state" community/junior colleges have fewer resources and smaller enrollments. The average institutional size of a "balance of state" community college was 3,624 total student enrollment and 1,298 technical students, while the average size of a "major metropolitan" area community/junior college was 8,588 total student enrollment and 2,458 technical students.

Findings

Institutional Curricula Profiles.

Appendix 2 (Volume II, page 9) contains composite information for TSTC, the "balance of state" and the "major metropolitan" areas including institutional curricula profiles. Table 13A contains the institutional curricula profiles for the "balance of state" and the "major metropolitan" area community/junior colleges. The first column contains the technical program cluster names with the "service-related" clusters listed in the top half of the table and the "export-related" clusters listed in the bottom half of the table. The second column contains the "balance of state" community/junior college data including number of programs, enrollment and graduates. The third column contains the data for the "major metropolitan" area community/junior colleges including number of programs, enrollment and graduates.

Table 13A

Institutional Curricula Profiles for the "Balance of State" and the "Major Metropolitan" Area Community/Junior Colleges

	"Balance of State" (36 Campuses)			"Major Metropolitan" Areas (29 Campuses)		
Technical Program Clusters	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates
Service-Related Clusters						
Medical/Health Care	171	15,697	3,842	235	14,673	3,097
Biotechnologies	0	0	0	1	2	0
Automotive/Heavy Mechanics	54	878	252	50	1,297	413
Building Systems & Construction	30	558	141	62	1,870	230
Applied Service & Business	386	16,986	2,519	481	29,739	3,137
Related Instruction	24	0	2	25	0	0
****Subtotals****	665	34,119	6,756	854	47,581	6,877
Export-Related Clusters						
Information	72	4,782	611	90	8,945	846
Energy & Environmental	13	212	23	24	332	30
Laser/Electronics	44	1,498	272	62	4,707	742
Manufacturing, Design & Engineering	90	2,056	339	131	4,438	586
Aerospace	7	175	44	33	1,095	183
Agribusiness	26	418	148	31	457	102
****Subtotals****	252	9,141	1,437	371	19,974	2,489
******Grand Totals******	917	43,260	8,193	1,225	67,555	9,366

It was evident from the data that the "balance of state" community/junior colleges and the "major metropolitan" area community/junior colleges had the same institutional curricula profile. Table 13B contains the same information as Table 13A except percentages were used to facilitate the comparison between the "balance of state" community/junior colleges and the "major metropolitan" area community/junior colleges.

Table 13B

Institutional Curricula Profiles for the "Balance of State" and the "Major Metropolitan" Area Community/Junior Colleges by Percentage

	"Balance of State" (36 Campuses)			"Major Metropolitan" Areas (29 Campuses)		
Technical Program Clusters	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)
Service-Related Clusters						
Medical/Health Care	18.65	36.29	46.89	19.18	21.72	33.07
Biotechnologies	0.00	0.00	0.00	0.08	N/A	0.00
Automotive/Heavy Mechanics	5.89	2.03	3.08	4.08	1.92	4.41
Building Systems & Construction	3.27	1.29	1.72	5.06	2.77	2.46
Applied Service & Business	42.10	39.26	30.75	39.27	44.02	33.49
Related Instruction	2.62	N/A	0.02	2.04	N/A	N/A
****Subtotals****	72.52	78.87	82.46	69.71	70.43	73.43
Export-Related Clusters						
Information	7.85	11.05	7.46	7.35	13.24	9.03
Energy & Environmental	1.42	0.49	0.28	1.96	0.49	0.32
Laser/Electronics	4.80	3.46	3.32	5.06	6.97	7.92
Manufacturing, Design & Engineering	9.81	4.75	4.14	10.69	6.57	6.26
Aerospace	0.76	0.40	0.54	2.69	1.62	1.95
Agribusiness	2.84	0.97	1.81	2.53	0.68	1.09
****Subtotals****	27.48	21.13	17.54	30.29	29.57	26.57
******Grand Totals******	100.00	100.00	100.00	100.00	100.00	100.00

The majority of all technical programs offered by the "balance of state" community/junior colleges were in the "service-related" cluster. Medical/Health Care and Applied Service & Business accounted for 61 percent of the programs within the "service-related" clusters. The concentration in these two program cluster areas was also found in the enrollment (76% for Fall 1990) and graduates (78% for fiscal year 1990-1991). The "service-related" clusters accounted for 73 percent of the programs offered, 79 percent of the

enrollment, and 82 percent of the graduates for the "balance of state" community/junior colleges.

For the "major metropolitan" area community/junior colleges, the majority of all the technical programs were also in the "service-related" cluster. Medical/Health Care and Applied Service & Business accounted for 58 percent of the "service-related" programs. The concentration in these two program cluster areas was also found in the enrollment (66% for Fall 1990) and graduates (67% for fiscal year 1990-1991). The "service-related" clusters accounted for 70 percent of the programs offered, 70 percent of the enrollment and 73 percent of the graduates for the "major metropolitan" area community/junior colleges.

There was little difference between the institutional profiles of the two classifications of community/junior colleges. Both classifications had the majority of their programs, enrollments and graduates in the "service-related" clusters. However, the "balance of state" community/junior colleges had a heavier concentration in the "service-related" clusters.

Table 14A contains the institutional curricula profiles for the "balance of state" community/junior colleges and TSTC. The first column contains the technical program cluster names under the "service-related" clusters listed in the top half of the table and under the "export-related" clusters listed in the bottom half of the table. The second column contains the "balance of state" community/junior college data including the number of programs, enrollment and graduates. The third column contains the TSTC data including the number of programs, enrollment and graduates.

Table 14A

Institutional Curricula Profiles for the "Balance of State" Community/Junior Colleges and TSTC

	"Balance of State" (36 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates
Service-Related Clusters						
Medical/Health Care	171	15,697	3,842	7	481	283
Biotechnologies	0	0	0	0	0	0
Automotive/Heavy Mechanics	54	878	252	13	827	340
Building Systems & Construction	30	558	141	8	470	161
Applied Service & Business	386	16,986	2,519	14	1,074	432
Related Instruction	24	N/A	2	4	0	0
****Subtotals****	665	34,119	6,756	46	2,852	1,216
Export-Related Clusters						
Information	72	4,782	611	13	1,207	287
Energy & Environmental	13	212	23	5	274	84
Laser/Electronics	44	1,498	272	14	1,541	402
Manufacturing, Design & Engineering	90	2,056	339	20	1,316	435
Aerospace	7	175	44	4	627	114
Agribusiness	26	418	148	5	253	107
****Subtotals****	252	9,141	1,437	61	5,218	1,429
******Grand Totals******	917	43,260	8,193	107	8,070	2,645

Table 14B contains the same information as Table 14A except percentages were used to facilitate the comparison between TSTC and the "balance of state" community/junior colleges. The same difference in institutional curricula profile between the community/junior colleges in total and TSTC was evident.

Table 14B

Institutional Curricula Profiles for the "Balance of State" Community/Junior Colleges and TSTC by Percentage

	"Balance of State" (36 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)
Service-Related Clusters						
Medical/Health Care	18.65	36.29	46.89	6.54	5.96	10.70
Biotechnologies	0.00	0.00	0.00	N/A	N/A	N/A
Automotive/Heavy Mechanics	5.89	2.03	3.08	12.15	10.25	12.85
Building Systems & Construction	3.27	1.29	1.72	7.48	5.82	6.09
Applied Service & Business	42.10	39.26	30.75	13.08	13.31	16.33
Related Instruction	2.62	N/A	0.02	3.74	N/A	N/A
****Subtotals****	72.52	78.87	82.46	42.99	35.34	45.97
Export-Related Clusters						
Information	7.85	11.05	7.46	12.15	14.96	10.85
Energy & Environmental	1.42	0.49	0.28	4.67	3.40	3.17
Laser/Electronics	4.80	3.46	3.32	13.08	19.10	15.20
Manufacturing, Design & Engineering	9.81	4.75	4.14	18.69	16.31	16.45
Aerospace	0.76	0.40	0.54	3.74	7.77	4.31
Agribusiness	2.84	0.97	1.81	4.67	3.12	4.05
****Subtotals****	27.48	21.13	17.54	57.01	64.66	54.03
******Grand Totals******	100.00	100.00	100.00	100.00	100.00	100.00

The contrast between the institutional curricula profiles of the "balance of state" community/junior colleges and TSTC was sharper than the contrast with the community/junior colleges in total, specifically in the total number of graduates. TSTC produced 54 percent of its graduates in the "export-related" cluster as compared to 18 percent for the "balance of state" community/junior colleges.

Table 15A contains the institutional curricula profiles for the "major metropolitan" area community/junior colleges and TSTC. The first column contains the technical program cluster names under the "service-related" clusters listed in the top half of the table and

under the "export-related" clusters listed in the bottom half of the table. The second column contains the "major metropolitan" area community/junior college data including the number of programs, enrollment and graduates. The third column contains the TSTC data including the number of programs, enrollment and graduates.

Table 15A

Institutional Curricula Profiles for the "Major Metropolitan" Area Community/Junior Colleges and TSTC

	"Major Metropolitan" Areas (29 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates	No. of Programs	Fall 1990 Enrollment	1990-91 Total Graduates
Service-Related Clusters						
Medical/Health Care	235	14,673	3,097	7	481	283
Biotechnologies	1	2	0	0	0	0
Automotive/Heavy Mechanics	50	1,297	413	13	827	340
Building Systems & Construction	62	1,870	230	8	470	161
Applied Service & Business	481	29,739	3,137	14	1,074	432
Related Instruction	25	N/A	N/A	4	0	0
****Subtotals****	854	47,581	6,877	46	2,852	1,216
Export-Related Clusters						
Information	90	8,945	846	13	1,207	287
Energy & Environmental	24	332	30	5	274	84
Laser/Electronics	62	4,707	742	14	1,541	402
Manufacturing, Design & Engineering	131	4,438	586	20	1,316	435
Aerospace	33	1,095	183	4	627	114
Agribusiness	31	457	102	5	253	107
****Subtotals****	371	19,974	2,489	61	5,218	1,429
******Grand Totals******	1,225	67,555	9,366	107	8,070	2,645

Table 15B contains the same information as Table 15A except percentages were used to facilitate the comparison between TSTC and the "major metropolitan" area community/junior colleges. The same difference in institutional curricula profiles was evident.

Table 15B

Institutional Curricula Profiles for the "Major Metropolitan" Area Community/Junior Colleges and TSTC by Percentage

	"Major Metropolitan" Areas (29 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)	No. of Programs (%)	Fall 1990 Enrollment (%)	1990-91 Total Graduates (%)
Service-Related Clusters						
Medical/Health Care	19.18	21.72	33.07	6.54	5.96	10.70
Biotechnologies	0.08	N/A	0.00	N/A	N/A	N/A
Automotive/Heavy Mechanics	4.08	1.92	4.41	12.15	10.25	12.85
Building Systems & Construction	5.06	2.77	2.46	7.48	5.82	6.09
Applied Service & Business	39.27	44.02	33.49	13.08	13.31	16.33
Related Instruction	2.04	N/A	N/A	3.74	N/A	N/A
****Subtotals****	69.71	70.43	73.43	42.99	35.34	45.97
Export-Related Clusters						
Information	7.35	13.24	9.03	12.15	14.96	10.85
Energy & Environmental	1.96	0.49	0.32	4.67	3.40	3.17
Laser/Electronics	5.06	6.97	7.92	13.08	19.10	15.20
Manufacturing, Design & Engineering	10.69	6.57	6.26	18.69	16.31	16.45
Aerospace	2.69	1.62	1.95	3.74	7.77	4.31
Agribusiness	2.53	0.68	1.09	4.67	3.12	4.05
****Subtotals****	30.29	29.57	26.57	57.01	64.66	54.03
******Grand Totals******	100.00	100.00	100.00	100.00	100.00	100.00

The contrast between the institutional curricula profiles of the "major metropolitan" area community/junior colleges and TSTC was basically the same as the contrast with the community/junior colleges in total. However, the "major metropolitan" area community/junior colleges concentration in the "service-related" clusters was slightly less than the community/junior colleges as a total. In the "export-related" clusters, the "major metropolitan" area community/junior colleges had a slightly higher concentration than the community/junior colleges as a total. TSTC produced 54 percent of its graduates in the

"export-related" cluster as compared to 27 percent for the "major metropolitan" area community/junior colleges.

"Graduate Percent Yield".

Table 16A contains the "Graduate Percent Yield" for the "balance of state" and "major metropolitan" area community/junior colleges. The first column contains a list of technical program clusters within the "service-related" clusters located at the top of the table and the "export-related" clusters located at the bottom of the table. The second column contains the "balance of state" community/junior college data including enrollment, graduates and "Graduate Percent Yield." The third column contains the "major metropolitan" area community/junior college data including enrollment, graduates and "Graduate Percent Yield."

Table 16A

"Graduate Percent Yield" for the "Balance of State" and "Major Metropolitan" Area Community/Junior Colleges

	"Balance of State" (36 Campuses)			"Major Metropolitan" Areas (29 Campuses)		
Technical Program Clusters	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)
Service-Related Clusters						
Medical/Health Care	15,697	3,842	24.48	14,673	3,097	21.11
Biotechnologies	0	0	0.00	2	0	0.00
Automotive/Heavy Mechanics	878	252	28.70	1,297	413	31.84
Building Systems & Construction	558	141	25.27	1,870	230	12.30
Applied Service & Business	16,986	2,519	14.83	29,739	3,137	10.55
Related Instruction	0	2	N/A	0	0	N/A
****Subtotals****	34,119	6,756	19.80	47,581	6,877	14.45
Export-Related Clusters						
Information	4,782	611	12.78	8,945	846	9.46
Energy & Environmental	212	23	10.85	332	30	9.04
Laser/Electronics	1,498	272	18.16	4,707	742	15.76
Manufacturing, Design & Engineering	2,056	339	16.49	4,438	586	13.20
Aerospace	175	44	25.14	1,095	183	16.71
Agribusiness	418	148	35.41	457	102	22.32
****Subtotals****	9,141	1,437	15.72	19,974	2,489	12.46
******Grand Totals******	43,260	8,193	18.94	67,555	9,366	13.86

The "balance of state" community/junior colleges had a better "Graduate Percent Yield" than the "major metropolitan" area community/junior colleges. For the "service-related" clusters, the "Graduate Percent Yield" for the "balance of state" community/junior colleges was 20 percent as compared to 14 percent for the "major metropolitan" area community/junior colleges. In the "export-related" clusters, the "balance of state" community/junior colleges had a 16 percent "Graduate Percent Yield" as compared to 12 percent for the "major metropolitan" area community/junior colleges. The highest "Graduate Percent Yield" for the "balance of state" community/junior colleges was 35

percent in Agribusiness as compared to 32 percent in Automotive/Heavy Mechanics for the "major metropolitan" area community/junior colleges.

Table 16B contains the "Graduate Percent Yield" for the "balance of state" community/junior colleges and TSTC. The first column contains a list of technical program clusters within the "service-related" clusters located at the top of the table and the "export-related" clusters located at the bottom of the table. The second column contains the "balance of state" community/junior college data including enrollment, graduates and "Graduate Percent Yield." The third column contains the TSTC data including enrollment, graduates and "Graduate Percent Yield."

Table 16B

"Graduate Percent Yield" for the "Balance of State" Community/Junior Colleges and TSTC

	"Balance of State" (36 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)
Service-Related Clusters						
Medical/Health Care	15,697	3,842	24.48	481	283	58.84
Biotechnologies	0	0	0.00	0	0	0.00
Automotive/Heavy Mechanics	878	252	28.70	827	340	41.11
Building Systems & Construction	558	141	25.27	470	161	34.26
Applied Service & Business	16,986	2,519	14.83	1,074	432	40.22
Related Instruction	0	2	N/A	0	0	N/A
****Subtotals****	34,119	6,756	19.80	2,852	1,216	42.64
Export-Related Clusters						
Information	4,782	611	12.78	1,207	287	23.78
Energy & Environmental	212	23	10.85	274	84	30.66
Laser/Electronics	1,498	272	18.16	1,541	402	26.09
Manufacturing, Design & Engineering	2,056	339	16.49	1,316	435	33.05
Aerospace	175	44	25.14	627	114	18.18
Agribusiness	418	148	35.41	253	107	42.29
****Subtotals****	9,141	1,437	15.72	5,218	1,429	27.39
******Grand Totals******	43,260	8,193	18.94	8,070	2,645	32.78

Overall, TSTC had a better "Graduate Percent Yield" than the "balance of state" community/junior colleges. In the "export-related" clusters, the TSTC "Graduate Percent Yield" was 33 percent as compared to 19 percent for the "balance of state" community/junior colleges. For the "service-related" clusters, the TSTC "Graduate Percent Yield" was 43 percent as compared to 20 percent for the "balance of state" community/junior colleges.

Table 16C contains the "Graduate Percent Yield" for the "major metropolitan" area community/junior colleges and TSTC. The first column contains a list of technical program clusters within the "service-related" clusters located at the top of the table and the "export-related" clusters located at the bottom of the table. The second column contains the "major metropolitan" area community/junior college data including enrollment, graduates and "Graduate Percent Yield." The third column contains the TSTC data including enrollment, graduates and "Graduate Percent Yield."

Table 16C

"Graduate Percent Yield" for the "Major Metropolitan" Area Community/Junior Colleges and TSTC

	"Major Metropolitan" Areas (29 Campuses)			TSTC (4 Campuses)		
Technical Program Clusters	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)	Fall 1990 Enrollment	1990-91 Total Graduates	Graduate Percent Yield (%)
Service-Related Clusters						
Medical/Healthcare	14,673	3,097	21.11	481	283	58.84
Biotechnologies	2	0	0.00	0	0	0.00
Automotive/Heavy Mechanics	1,297	413	31.84	827	340	41.11
Building Systems & Construction	1,870	230	12.30	470	161	34.26
Applied Service & Business	29,739	3,137	10.55	1,074	432	40.22
Related Instruction	0	0	N/A	0	0	N/A
****Subtotals****	47,581	6,877	14.45	2,852	1,216	42.64
Export-Related Clusters						
Information	8,945	846	9.46	1,207	287	23.78
Energy & Environmental	332	30	9.04	274	84	30.66
Laser/Electronics	4,707	742	15.76	1,541	402	26.09
Manufacturing, Design & Engineering	4,438	586	13.20	1,316	435	33.05
Aerospace	1,095	183	16.71	627	114	18.18
Agribusiness	457	102	22.32	253	107	42.29
****Subtotals****	19,974	2,489	12.46	5,218	1,429	27.39
******Grand Totals******	67,555	9,366	13.86	8,070	2,645	32.78

In all technical program clusters, TSTC had a better "Graduate Percent Yield" than the "major metropolitan" area community/junior colleges. In the "export-related" clusters, TSTC had a "Graduate Percent Yield" of 33 percent as compared to 14 percent for the "major metropolitan" area community/junior colleges. For the "service-related" clusters, TSTC had a "Graduate Percent Yield" of 43 percent as compared to 14 percent for the "major metropolitan" area community/junior colleges.

In summary, there was a substantial difference in the "Graduate Percent Yields" for TSTC, the "balance of state" community/junior colleges and the "major metropolitan" area community/junior colleges. The highest "Graduate Percent Yields" for TSTC were in:

Medical/Health Care (59%),
Agribusiness (42%),
Automotive/Heavy Mechanics (41%), and
Applied Service & Business (40%).

The highest "Graduate Percent Yields" for the "major metropolitan" area community/junior colleges were in:

Automotive/Heavy Mechanics (32%),
Agribusiness (22%),
Medical/Health Care (21%), and
Aerospace (17%).

The highest "Graduate Percent Yields" for the "balance of state" community/junior colleges were in:

Agribusiness (35%),
Automotive/Heavy Mechanics (29%),
Building Systems & Construction (25%), and
Aerospace (25%).

In 19 of the 20 program cluster comparisons, TSTC had a higher "Graduate Percent Yield" than the community/junior colleges. The only exception was in the Aerospace cluster, where the "balance of state" community/junior colleges had a "Graduate Percent Yield" of 25 percent as compared to 18 percent for TSTC.

The differences between the "Graduate Percent Yields" become very significant given the fact that TSTC represents only 6 percent of the two-year postsecondary colleges in the state. The "balance of the state" and "major metropolitan" area community/junior colleges represent 52 percent and 42 percent of the two-year postsecondary colleges respectively.

Graduates.

Table 17 contains graduate data for the state, "balance of state" and "major metropolitan" area community/junior colleges and TSTC. The data utilized in the analysis was from the Vocational Education Postsecondary Institutions Report (VEPSI) for the period July 1989 - June 1990 (Volume II, Appendix 4, page 113). The first column contains the classification of graduates by gender and ethnicity. The second column contains the statewide graduate numbers and percentages for gender and ethnicity. The third column contains the community/junior college graduate numbers and percentages for gender and ethnicity divided between the "balance of state" and "major metropolitan" area community/junior colleges. The fourth column contains TSTC graduate numbers and percentages for gender and ethnicity.

Table 17

Total Graduates by Gender and Ethnicity During the Period July 1989 Through June 1990 for TSTC and Community/Junior Colleges

	Statewide	Community/Junior Colleges (65 Campuses)		TSTC (4 Campuses)
		"Balance of State" (36 Campuses)	"Major Metropolitan" Areas (29 Campuses)	
Classification	Total Graduates	Total Graduates	Total Graduates	Total Graduates
Graduates	21,453	9,203	9,627	2,623
Percent (%) Graduates	100.00	42.90	44.87	12.23
Males	9,422	3,141	4,339	1,942
Percent (%) Males	100.00	33.34	46.05	20.61
Females	12,031	6,062	5,288	681
Percent (%) Females	100.00	50.39	43.95	5.66
Black	2,385	819	1,446	120
Percent (%) Black	100.00	34.34	60.63	5.03
Hispanic	4,291	1,669	1,758	864
Percent (%) Hispanic	100.00	38.90	40.97	20.14
White	14,191	6,575	6,011	1,605
Percent (%) White	100.00	46.33	42.36	11.31
Other Ethnicity	586	140	412	34
Percent (%) Other	100.00	23.89	70.31	5.80

The "balance of state" community/junior colleges and the "major metropolitan" area community/junior colleges graduated approximately the same proportion of statewide graduates. The "balance of state" community/junior colleges graduated a higher percentage of females (50%) than the "major metropolitan" community/junior colleges (44%). Both classifications of community/junior colleges graduated approximately the same number of Hispanics (approximately 40%). The "major metropolitan" community/junior colleges graduated significantly more Blacks (61%) and other ethnicity (Indian and Asian, 70%) than the "balance of state" community/junior colleges (34% and 24%, respectively).

Since TSTC represents only 6 percent of the two-year postsecondary colleges in Texas, one would expect the college to produce a similar percentage "share" of the statewide graduates. However, TSTC graduated 12 percent of the statewide total of graduates, twice its "share" of graduates. TSTC also graduated 20 percent of the Hispanic graduates, three times the number of Hispanic graduates expected. TSTC produced 6 percent of the female graduates and other ethnicity (Indian and Asian), and 5 percent of Black graduates, approximately the number of graduates expected.

Table 18 contains the special population data for statewide, "balance of state" and "major metropolitan" community/junior college and TSTC graduates. The data utilized in the analysis was from the VEPSI Report for the period July 1989 - June 1990 (Volume II, Appendix 4, page 113). The first column contains the classification of graduates by special population categories. The second column contains the statewide graduate numbers and percentages for the special population categories. The third column contains the community/junior college graduate numbers and percentages for the special population categories divided between the "balance of state" and "major metropolitan" area community/junior colleges. The fourth column contains TSTC graduate numbers and percentages for the special population categories.

Table 18

*Total Graduates by Special Population Categories During the Period July 1989 Through June 1990 for TSTC and the Community/Junior Colleges**

	Statewide	Community/Junior Colleges (65 Campuses)		TSTC (4 Campuses)
		"Balance of State" (36 Campuses)	"Major Metropolitan" Areas (29 Campuses)	
Special Population Category	Total Graduates	Total Graduates	Total Graduates	Total Graduates
Handicapped	1,221	318	414	489
Percent (%) Handicapped	100.00	26.04	33.91	40.05
Limited English Proficiency	1,187	360	549	278
Percent (%) Limited English Proficiency	100.00	30.33	46.25	23.42
Disadvantaged	8,777	3,920	2,800	2,057
Percent (%) Disadvantaged	100.00	44.66	31.90	23.44
Single Parent	1,652	914	536	202
Percent (%) Single Parent	100.00	55.33	32.45	12.23
Sex Bias	1,467	391	732	344
Percent (%) Sex Bias	100.00	26.65	49.90	23.45

* "Special population" is a subset of the total number of graduates. A graduate can be classified in more than one category.

The "balance of state" community/junior colleges graduated 55 percent of the "Single Parent" graduates statewide as compared to 32 percent for the "major metropolitan" area community/junior colleges. The "balance of state" also graduated 45 percent of the "Disadvantaged" graduates statewide as compared to 32 percent for the "major metropolitan" area community/junior colleges. The "major metropolitan" area community/junior colleges graduated the highest percentages statewide in "Sex Bias" graduates (50%) and "Limited English Proficiency" graduates (46%).

TSTC graduated 40 percent of the statewide total of "Handicapped" graduates. TSTC also graduated 23 percent of the graduates statewide classified as "Limited English Proficiency," "Disadvantaged," and "Sex Bias." TSTC graduated 12 percent of the "Single Parent" graduates statewide. While representing only a six percent proportion of the total number of two-year postsecondary institutions, TSTC graduated a significant proportion of the special population graduates statewide.

Summary Observations

A comparative analysis of the technical programs offered, enrollments, graduates, and "Graduate Percent Yield" for TSTC as compared with the community/junior colleges located in the "major metropolitan" areas and the "balance of state" provided some interesting observations:

(1) The number of special population students who graduated from TSTC as compared to the number who graduated from community/junior colleges in Texas, showed the critical importance of TSTC to Texas as a desired and proven higher education alternative, particularly for those persons most "at risk." "Handicapped" students were particularly advantaged by attending TSTC. This finding was unexpected since the TSTC campuses are located outside the "major metropolitan" areas where the vast majority of special population students live.

(2) The magnitude of the skewing of the number and percentage of graduates from the technical program clusters offered in the "balance of state" community/junior colleges toward Medical/Health Care and Applied Service & Business was unanticipated. As a result, the percentage of "balance of state" graduates in the "service-related" program clusters was 82 percent as compared to 17 percent in the "export-related" program clusters. The percentages for the community/junior colleges located in the "major metropolitan" areas were similar, with 73 percent of the graduates in the "service-related" program clusters and 27 percent in the "export-related" program clusters. TSTC had a more balanced profile with 54 percent of its graduates in the "export-related" program clusters and 46 percent in the "service-related" program clusters.

(3) The "Graduate Percent Yield" advantage for students attending TSTC as compared to the community/junior colleges located in the "major metropolitan" areas and the "balance of state" was much greater than expected. TSTC students were much more successful in completing a "coherent program of study" and securing a degree or certificate than students from the community/junior colleges regardless of their location. In 19 out of 20 technical program cluster comparisons, the "Graduate

Percent Yield" for TSTC exceeded that of the community/junior colleges in either the "major metropolitan" areas or the "balance of state." The margin of advantage for TSTC students was greatest in the "export-related" program clusters, where in four out of six technical program cluster comparisons, TSTC had a "Graduate Percent Yield" twice that of the community/junior colleges located in the "major metropolitan" areas.

(4) Institutional size, when considered as a factor associated with "major metropolitan" area (larger) community/junior colleges and the "balance of state" (smaller) community/junior colleges, did not appear to be significant in differentiating between the program offerings, enrollments, graduates, and "Graduate Percent Yield" for the community/junior colleges. It might reasonably have been expected that the "major metropolitan" area community/junior colleges would have had a greater percentage of their programs, enrollments, and graduates in the "export-related" program clusters. Instead, their institutional curricula profile looked much like that of the smaller community/junior colleges located in the "balance of state." Viewed in terms of "Graduate Percent Yield," the "balance of state" community/junior colleges had a higher percentage in all six of the "export-related" technical program clusters, which was unexpected since the largest number of exporting businesses and industries are located in urban or surrounding areas. The same pattern of "Graduate Percent Yield" dominance of the "balance of state" community/junior colleges over the "major metropolitan" area community/junior colleges was also found in the "service-related" program clusters where the "balance of state" community/junior colleges had higher percentages in three of the four technical program clusters, the exception being Automotive/Heavy Mechanics.

COMPARISON OF STATE FUNDING PER TECHNICAL PROGRAM CLUSTER GRADUATES FOR TSTC AND THE COMMUNITY/JUNIOR COLLEGES

The purpose of this section was to examine and compare the amount of state funding per technical program cluster graduate (Volume II, Appendix, Page 9). There were two analyses performed:

(1) statewide analysis - comparison between the statewide, community/junior colleges and TSTC cost per graduate in the technical program clusters, "service-related" and "export-related" clusters, and

(2) institutional analysis - comparison between the "balance of state" and "major metropolitan" area community/junior colleges and TSTC cost per graduate in the technical program clusters, "service-related" and "export-related" clusters.

Definitions

The term or performance indicator of "State Funding Per Graduate" utilized in this study was calculated by dividing the funding amount for each technical program cluster by the number of graduates in that technical program cluster (Volume II, Appendix 2, page 9).

Findings

Table 19 contains the "state funding per graduate" for all two-year public colleges. The first column contains the technical program clusters within the "service-related" and the "export-related" clusters. The second column contains the "state funding per graduate" for the two-year public colleges, the community/junior colleges and TSTC within each technical program cluster.

Table 19

"State Funding Per Graduate" for All Two-Year Public Colleges

	State Funding Per Graduate ($)		
Technical Program Clusters	All Two-Year Public Colleges	Community/Junior Colleges (65 Campuses)	TSTC (4 Campuses)
Service-Related Clusters			
Medical/Health Care	8,275	8,382	5,658
Biotechnologies	N/A	N/A	N/A
Automotive/Heavy Mechanics	8,461	8,516	8,354
Building Systems & Construction	9,357	9,899	8,109
Applied Service & Business	9,344	9,550	6,654
Related Instruction	N/A	N/A	N/A
****Subtotals****	9,132	9,175	8,649
Export-Related Clusters			
Information	20,885	22,615	12,100
Energy & Environmental	11,340	11,233	11,407
Laser/Electronics	8,809	7,938	11,006
Manufacturing, Design & Engineering	13,422	14,851	10,383
Aerospace	19,592	17,365	24,027
Agribusiness	7,774	8,088	7,039
****Subtotals****	14,596	15,613	11,801
******Grand Totals******	10,580	10,615	10,352

There were significant differences in the amount of state funds (cost) per graduate between TSTC and the community/junior colleges within "service-related" and "export-related" clusters. The cost in state funds per graduate for the "service-related" cluster was $8,649 for TSTC as compared to a cost of $9,175 for the community/junior colleges. In the "export-related" clusters, TSTC had a cost of $11,801 per graduate as compared to $15,613 per graduate for the community/junior colleges. Given these comparatively significant differences in the state funds per graduate, it is curious that the overall cost in state funds per technical graduate at TSTC was only slightly less than the state funds (cost) per technical graduate for the community/junior colleges. The reason was that TSTC graduated

the majority (54%) of its graduates in the more costly "export-related" technical program clusters whereas the community/junior colleges graduated the majority (78%) of their graduates from the less costly "service-related" technical program clusters.

Compared for each technical program cluster, TSTC had a lower cost in state funds per graduate in seven out of the ten applicable clusters. TSTC had significantly lower cost per graduates in the following technical program clusters:

Medical/Health Care ($5,658),
Building Systems & Construction ($8,109),
Applied Service & Business ($6,654),
Information ($12,100), and
Manufacturing, Design & Engineering ($10,383).

For the same technical program clusters, the community/junior colleges had the following costs per graduates:

Medical/Health Care ($8,382),
Building Systems & Construction ($9,899),
Applied Service & Business ($9,550),
Information ($22,615), and
Manufacturing, Design & Engineering ($14,851).

Although two of these program clusters listed are in the "service-related" clusters where the community/junior colleges had the largest concentration of their graduates (Medical/Health Care and Applied Business & Service accounted for 71% of the graduates), TSTC had a lower cost per graduate.

TSTC had a higher cost per graduate in three technical program clusters than the community/junior colleges:

Energy & Environmental ($11,407),
Laser/Electronics ($11,006), and
Aerospace ($24,027).

The community/junior colleges had the following cost per graduate for the same programs:

Energy & Environmental ($11,233),
Laser/Electronics ($7,938), and
Aerospace ($17,365).

These programs are classified under the "export-related" clusters, where TSTC had the majority of its graduates. Two of the program clusters, Laser/Electronics and Aerospace are equipment intensive (lasers and airplanes) and represent a high cost investment in

capital equipment and maintenance for the college. TSTC has two of the three laser programs in Texas. TSTC also has the only commercial pilot training program in the state that owns its own airplanes. These programs accounted for 42 percent of the TSTC graduates in the "export-related" clusters. The "export-related" clusters accounted for 23 percent of the community/junior college graduates of which 33 percent were in the Energy & Environment, Laser/Electronics and Aerospace programs.

Table 20 contains the "state funding per graduate" for the "balance of state" and "major metropolitan" area community/junior colleges and TSTC. The first column contains the names of the technical program clusters within the "service-related" and the "export-related" clusters. The second column contains the "state funding per graduate" for the "balance of state" and "major metropolitan" area community/junior colleges and TSTC within each technical program cluster.

Table 20

"State Funding Per Graduate" for the "Balance of State" and "Major Metropolitan" Area Community/Junior Colleges and TSTC

	State Funding Per Graduate ($)		
Technical Program Clusters	"Balance of State" Community/Junior Colleges (36 Campuses)	"Major Metropolitan" Area Community/ Junior Colleges (29 Campuses)	TSTC (4 Campuses)
Service-Related Clusters			
Medical/Health Care	7,866	9,023	5,658
Biotechnologies	N/A	N/A	N/A
Automotive/Heavy Mechanics	9,238	8,075	8,354
Building Systems & Construction	7,588	11,316	8,109
Applied Service & Business	8,330	10,530	6,654
Related Instruction	N/A	N/A	N/A
****Subtotals****	8,273	10,061	8,649
Export-Related Clusters			
Information	20,598	24,072	12,100
Energy & Environmental	9,231	12,767	11,407
Laser/Electronics	9,159	7,491	11,006
Manufacturing, Design & Engineering	13,068	15,882	10,383
Aerospace	9,781	19,188	24,027
Agribusiness	7,692	8,663	7,039
****Subtotals****	14,814	16,074	11,801
******Grand Totals******	9,421	11,659	10,352

The cost in state funds per graduate for TSTC in the "service-related" and the "export-related" program clusters was considerably less than that for the "major metropolitan" area community/junior colleges. For the "service-related" clusters, the "major metropolitan" area community/junior colleges had a cost per graduate of $10,061, 16 percent higher than TSTC's cost per graduate of $8,649. For the "export-related" program clusters, the "major metropolitan" area community/junior colleges had a cost per graduate of $16,074, 36 percent higher than TSTC's cost per graduate of $11,801.

When compared with the cost per graduate for the "balance of state" community/junior colleges, TSTC had a cost per graduate 26 percent less than the $14,814 cost per graduate of the "balance of state" community/junior colleges in the "export-related" program clusters. For the "service-related" program clusters, the "balance of state" community/junior colleges had a cost per graduate of $8,273 compared to TSTC's cost per graduate of $8,649. The cost advantage of the "balance of state" community/junior colleges came from the fact that 82 percent of their total number of graduates are in the less costly "service-related" program clusters as compared to 73 percent for the "major metropolitan" area community/junior colleges and 46 percent for TSTC.

Summary Observations

While these findings do not directly address the issue of unnecessary program duplication, it is vitally important to know and understand how much it costs the taxpayers of Texas to produce a technical graduate. Given such information, a more informed decision can be made concerning which institutions offer the students and taxpayers the most effective and efficient postsecondary technical education. Clearly, based on the findings from this study, TSTC provides <u>all</u> Texans access to quality technical education and a greater probability of completing a "coherent program of study" and graduating; and, TSTC provides the Texas taxpayers lower reasonable cost per graduate (especially for the "export-related" technical programs) than the community/junior colleges. The comparative lower cost per graduate from technical programs for TSTC is given additional significance since TSTC graduates are required to take from 30 percent to 50 percent more contact hours of instruction before graduating in most technical programs.

SUMMARY

Texas State Technical College is undergoing reviews by the Texas Higher Education Coordinating Board and a Subcommittee of the House Committee on Higher Education. These reviews were undertaken due to a concern that unnecessary duplication exists in programs offered by TSTC and the Texas community/junior colleges. TSTC undertook a comparative analysis study of the community/junior colleges of Texas and TSTC. Information utilized in the study included:

(1) institutional curricula profiles;
(2) institutional and program graduates and "Graduate Percent Yield;"
(3) special populations and "Graduate Percent Yield;"
(4) major metropolitan area institutions (large) excluding TSTC;
(5) balance of state institutions (small) excluding TSTC;
(6) cost per graduate;
(7) export-related program clusters; and
(8) service-related program clusters.

A review of the literature was conducted by TSTC to provide background information, context, and understanding of potential differences between community/junior college and technical college education. The National Assessment of Vocational Education (NAVE) study, published in 1989, served as the primary resource document for this comparative analysis study. The outcomes of the NAVE study and other studies revealed that while most students have access to higher education through two-year colleges, they do not stay in school long enough to receive indepth technical education and training. This problem is particularly acute for special population students. An increasing number of two-year college students were found to be "milling around" in college rather than completing a "coherent program of study." Those students who failed to complete a "coherent program of study" did not gain measurable economic benefits including increased wages that result from completion.

Results of the TSTC study are shown in issue-specific, disaggregated data tables located in Volume II-Appendices for various segments of the state and institutional groupings. The tables contain institutional descriptors and performance indicators supported by detail data compiled for each public two-year college. The data bases were compiled using dBase IV and subsequently queried using the same software program. Lotus 123 was

also used to create selected tables. Each comparison was described in a separate section. A list of the comparison made between TSTC and the community/junior colleges follows:

(1) Institutional curricula profiles - compared by technical program clusters, "service-related" and "export-related" program clusters;

(2) "Graduate Percent Yield" - compared by technical program clusters, "service-related" and "export-related" program clusters;

(3) Graduates - compared by gender, ethnicity and special populations in total. Also compared by gender, ethnicity and special populations within technical program clusters, "service-related" and "export-related" program clusters;

(4) "Major metropolitan" area institutions, "balance of state" institutions and TSTC compared in terms of institutional curricula profiles, "Graduate Percent Yield," and graduates;

(5) Cost per graduate - compared by "major metropolitan" area institutions, "balance of state" institutions, all community/junior colleges and TSTC in terms of "service-related" and "export-related" program clusters.

TSTC was found to have a different institutional curricula profile from the community/junior colleges and because of this difference TSTC substantially met the mandated role and mission as established by the Legislature. TSTC had a phenomenal success rate in having students complete a "coherent program of study" and graduate. The student completion rate was especially pronounced for the special population students enrolled in the "export-related" technical programs. TSTC was found to have a comparative lower cost per graduate than the community/junior colleges which is given additional significance since TSTC graduates are required to take 30 percent to 50 percent more contact hours of instruction before graduating in most technical programs.

CONCLUSIONS

1. **The Texas Higher Education Coordinating Board, to comply with federal and state reporting requirements, has collected a wealth of data on public two-year colleges. This data can and should be used for implementation of a performance-based budgeting system, and to provide comparative reports for prospective students, taxpayers, governing boards, state agencies, and business and industry.** Use of the available Coordinating Board data would permit Texas to establish comparative performance benchmarks and assume a national leadership role for postsecondary technical education.

2. **Texas State Technical College has a significantly different curricula profile reflective of "export-related" technologies (e.g., manufacturing, electronics, lasers, computers, energy),** while the curricula profile of the community/junior colleges emphasizes the "service-related" technologies (e.g., marketing, office skills, health care, criminal justice). The "export-related" technologies represent those technical programs most directly supportive of businesses and industries which sell Texas-produced goods and services outside the state. These "export-related" technologies are critical to the economy of Texas and its ability to effectively compete in the world marketplace. Most "export-related" technologies teach the productive application of scientific principles based on the physical sciences (e.g., physics, chemistry). As a result, these program are expensive and typically require a significant investment in equipment and facilities.

3. **TSTC offers students a unique curricula design and instructional delivery system different from that of the community/junior colleges.** Students choosing to enroll at TSTC do so knowing they will be required to **take more courses** with **more contact hours** to complete a degree, **spend more time** in completing laboratory assignments and projects, and be encouraged to graduate on-time with their class. **While some technical programs and courses may have similar titles, there is no unwarranted duplication of courses or programs.**

4. **The unnecessary duplication of technical programs is an issue of legitimate concern. The rising cost of technology, especially for those technologies requiring expensive capital equipment for laboratories and highly specialized faculty, should be approved only after careful study. Program submission to the Coordinating Board, as a positioning exercise by institutions to prevent other institutions from securing similiar program approval, should be discouraged.** The present system of individual program approval is rapidly becoming dysfunctional given the changed workplace demands for new technicians cross-trained in different technology applications. These changes require two-year colleges to stress the clustering of technologies into supportive families of technical programs facilitating the exchange of ideas, information, and resources. The clustering of technologies will permit the colleges and the state to benefit from economies-of-scale.

5. **Community/junior colleges have a curricula profile skewed toward "service-related" technologies, especially those programs in the Medical/Health Care technologies and**

in the Applied Service & Business technologies. A preliminary analysis of trend data found a continued skewing of technical programs, enrollments, and graduates toward "service-related" technologies. The reason is that the Coordinating Board funding formula, which is enrollment-driven, favors those programs with the largest enrollments, lowest capital costs, best students who require fewer support services, opportunity to utilize part-time faculty to reduce salary costs, and programs which have the least risk of failure. The "service-related" technologies also educate and train students for the fastest growing employment areas. Unfortunately, except for the Medical/Health Care cluster, most of the new "service-related" jobs, despite the education level of the employee, pay low wages and require minimal skills.

6. **Texas State Technical College offers the majority of its technical programs in the "export-related" technologies, most of which require higher skill levels for employment and pay higher wages.** The "export-related" technologies directly support the economic diversification of Texas by providing business and industry with quality technical graduates capable of being productive on the work floor or in the workplace with minimal internal training. This is especially important for the small- and medium-size businesses and industries who are financially unable to provide the time and financial support needed for new employees to become productive through expensive and extensive internal training. The larger corporations are better able to cope with the problem.

7. **Students attending Texas State Technical College are much more likely to complete a technical degree or certificate program than students who attend a community/junior college.** Graduation or completion of a "coherent program of study" from a quality technical program was identified by the National Assessment of Vocational Education study in 1989 to be the greatest problem facing technical education in the United States. The problem was most acute for minority students and special population students who were the least likely to graduate.

8. **The outstanding graduation record of Texas State Technical College for minority and special population students from "export-related" technical programs, which require a working knowledge of math and science, represents a significant educational achievement for TSTC and supports its instructional methodology and curricula design.** The successful graduation of those students considered most "at risk" in technical programs critical to the economic diversification of Texas not only benefits the economy of the state, but helps to reduce the present and potential social and welfare costs to the state. Much more needs to be accomplished by postsecondary institutions to address the educational and training needs of minority and special population students.

9. **Community/junior colleges (29 campuses) located in the "major metropolitan" areas were not as successful in having students graduate as those community/junior colleges (36 campuses) located in the "balance of state." None were as successful as Texas State Technical College.** The lower graduation rate for the "major metropolitan" area community/junior colleges may have resulted from the primary focus of their technical programs on retraining or continuing education rather than on graduation which is the basis for most pre-employment training. Another reason

for the lower graduation rate might be a technical program focus for transfer to a four-year college which does not necessitate completion of a degree. The graduation comparisons for this study were predicated on students who declared a technical education major. For the purposes of this study, "declared majors" were students who professed the intention of completing a technical degree.

10. **The lower cost per graduate and the higher "Graduate Percent Yield" along with the demonstrated success in meeting the educational needs of minority and special population students makes Texas State Technical College the most cost-effective, educationally sound and economically vital two-year public college in Texas.** These accomplishments were achieved despite the fact that:

    (1) TSTC has no tax base and, as a result, an income differential approximately 20 percent less than the community/junior colleges; and

    (2) TSTC has no dedicated source of facility or equipment funds which is available to all other institutions of higher education through either the Permanent University Fund (PUF), the Higher Education Assistance Fund (HEAF), or the ability to levy property taxes.

11. **The present funding formula which rewards only inputs (enrollment) and not outputs or outcomes (graduates) has had a perverse effect upon the type and quality of technical programs offered, and upon graduates, "Graduate Percent Yield," and the graduation rates of minorities and special population students.** A formula which is totally enrollment-driven rewards institutional behavior contrary to those factors known to be essential for quality technical education:

    (1) more time spent by the student in the laboratory and on projects which are relevant to the modern workplace;

    (2) more direct teacher involvement with the student on a regular basis;

    (3) greater integration of classroom and laboratory learning activities which integrate academic and application skills; and

    (4) more involvement by business and industry in curricula development instructional delivery to assure relevancy.

    The preceding quality factors associated with student learning place emphasis upon student graduation. **The present enrollment-driven funding formula does not reward such desired institutional behavior. Instead, by emphasizing only enrollments, there is a disincentive to spend the time, energy, and funds necessary to help students graduate.** What really matters is that they enroll and stay in class through the 12th class day which is the critical deadline for two-year colleges to receive their funding.

12. **Medical/Health Care technologies, assessed in terms of programs offered, students served, graduates, and cost, represent an exemplary associate degree and certificate model which other technical program clusters should consider adopting. TSTC uses**

a similar curricula and instructional model for all its programs. Key factors in the Medical/Health Care and TSTC models are:

(1) the establishment of acknowledged standards which must be met before program approval is given;

(2) a highly structured curriculum requiring full-time faculty, essential course prerequisites, and the schedule blocking of students by class;

(3) significant participation by the employer community at all levels (e.g., curricula design, laboratory experience, instructional demonstrations) of student education;

(4) required demonstration of student competencies by written test and observed performance;

(5) extensive student laboratory time, either college-based or employer-based, is given to workplace relevant projects and activities; and

(6) the active support of employers in securing state, federal and private support is essential.